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In Vitro Assessment of Color Stability Of Ceramic Veneers With Two Thicknesses, Cemented With Three Different Luting Resins

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ABSTRACT

Purpose: The objective of the study was to evaluate color stability of Light cure resin cement, Dual cure resin cement and flowable composite resin while cementing ceramic veneers of thicknesses 0.4 mm and 0.7 mm before and after Thermocycling Aging.

Materials and methods: Wax discs were fabricated in a Copper mold, to construct Ceramic discs of IPS e.max press with two thicknesses of 0.4 mm and 0.7 mm. The ceramic discs were cemented by Light cure resin cement, Dual cure resin cement and flowable composite resin to composite plates after the application of the different surface treatments. All specimens were subjected to Thermocycling Aging to get a record for ΔE before and after thermocycling. Finally, data were statistically analyzed.

Results: Light cure resin cement showed least difference in color before and after thermocycling aging, followed by Flowable Composite resin, while Dual cure resin cement showed highest color change, however they were all in the acceptable range. 0.7 mm Thickness of ceramic discs showed more color stability before and after Thermocycling aging than 0.4 mm, however they were both in the acceptable range.

1.Introduction:

Esthetic dentistry is concerned with restoring the natural teeth appearance by direct and in direct means of restoration. It is a very challenging and demanding field of dental science. Recently, lithium disilicate; a recent commonly used type of

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dental ceramics nowadays in dental practice is used to restore anterior and posterior teeth. It provides high esthetic properties for anterior teeth and high physical and mechanical properties for posterior teeth restorations. The pressed lithium disilicate ceramics provides ceramic restorations with thin marginal thickness and a slight higher strength compared to milled ceramics. This is considered a huge advantage for the fabrication very thin types of restorations. Bonding can take place by mechanical retention, chemical reaction or the combination of both and is powerfully related to the composition of the resin cement system and the surface treatment of the restoration in addition to the dental hard tissue(1)little information is available on the strength of the bond between different cements and fixed prosthodontic restorative materials.This study determined the shear-bond strength of cementing agents to high-gold-content alloy castings and different dental ceramics: high-strength aluminum oxide (Procera AllCeram(2) especially silica-based lithium disilicate and non-silicate-based Zirconia, have become a topic of interest in the field of dentistry. It is still difficult to achieve a strong and durable resin-ceramic adhesion, especially resin-Zirconia bonding. Approach: The article reviews the current literature published in the past 5 years, focusing on the latest resin bonding techniques (including surface treatment, priming and cementation.

Determining long term esthetic clinical success of cemented ceramic restorations depends on its color stability related to the ceramic material as well as the cement used(3). Color stability of dental resin cements is usually detected at the restoration margins which expose the used cement to the oral environment(4). Resin cement discoloration is of two types; intrinsic and extrinsic factors(5). Intrinsic factors are related to the material itself like the chemical composition of the material and of the matrix, as well as filler and photoinitiator type, and the ratio of the carbon-carbon double bond. Extrinsic factors are due to stains from beverages and smoking and are related to physicochemical characteristics of the cement especially at the restoration margins(4)(5).

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measured color stability of light cured and dual cured resin cements used with ceramic laminate veneers(6)0.3-mm-thick ceramic laminate veneers were cemented on the buccal surface of the second premolars without tooth preparation. A randomized application of light-polymerized cement was used on one side and a dual-polymerized cement on the contralateral side. The operator and participants were blinded to the activation mode. Color was evaluated by a blinded evaluator with a spectrophotometer at 24 hours and at 2, 6, 12, and 24 months after cementation. The CIELab (ΔE*ab. They performed an experiment on 10 individuals by cementation of 0.3 mm thick ceramic veneers on buccal surfaces of second premolars on one side with light cured resin cement on the other side with dual cured resin cement. Color was measured using spectrophotometer 24 hours after cementation, then at 2, 6, 12, 24 months after cementation. They concluded that light and dual polymerizing modes showed similar color change for the evaluated periods.

The purpose of this study was to evaluate color stability of ceramic veneers of two thicknesses 0.4 mm and 0.7 mm when cemented using Light cure resin cement, Dual cure resin cement and Flowable composite resin before and after Thermocycling aging.

2.Materials and methods:

Specimens were divided into 3 main groups according to the type of the resin used; Group (L) : Ceramic veneers cemented with light cure resin cement (n=14), Group (D): Ceramic veneers cemented with Dual cure resin cement(n=14) and Group (F): Ceramic veneers cemented with flowable composite resin(n=14). Each main group was further divided into 2 subgroups according to the thickness of ceramic veneers. Subgroup (A) with ceramic veneer thickness of 0.4mm (n=7). Subgroup (B) with ceramic thickness of 0.7mm(n=7). Then all specimens were subjected to thermocycling aging for

10000 cycles, and color was measured before and after thermocycling using Vita EasyShade Advance 4.0.

3.Statistical analysis:

Numerical data were explored for normality by checking the data distribution, calculating the mean and median values and using Kolmogorov-Smirnov and Shapiro-Wilk tests. Data showed parametric distribution so; it was represented by mean and standard deviation (SD) values. Two-way ANOVA was used to study the effect of different tested variables and their interaction. Comparison of main and simple effects were done utilizing benferroni correction. The significance level was set at $P \leq 0.05$ within all tests. Statistical analysis was performed with IBM*® SPSS**® Statistics Version 26 for Windows.

4.Results:

Color Stability was affected by type of resin cement used as Light cure resin cement showed highest color stability before and after thermocycling aging, followed by Flowable composite resin, then the Dual cure resin cement, however all of these changes were in the acceptable range.

Thickness of ceramic veneer used also affected color stability as 0.7mm thickness showed more color stability than 0.4mm thickness of ceramic veneers, although both were in the acceptable range.

5.Discussion :

The results showed that color stability of resin cements is dependent on the type of cement and mode of curing, although all of these types are acceptable. Also results showed that ceramic thickness of used veneers affects color stability as increasing veneer thickness helps in making it more stable and as well both of them were acceptable.

6.Limitation of the study:

Further investigations for evaluation of color stability invivo would be required helping in confirmation of reached results.

7.Conclusion:

Within the limitations of this study, Light cure resin cement, Flowable composite resin and Dual cure resin cement have effects on color stability of cemented veneers, as ceramic thickness of used veneers, however all of these factors are within the acceptable range.

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