THE EFFECT OF DIFFERENT MOUTH WASHES AND TOOTH BRUSHING TECHNIQUES ON COLOR STABILITY OF CERAMIC VENEERS

Rana Abdelhameed Elgazar, BDS, MDS[1]*, Gaber Ebrahim Masoud, BDS, MDS, PHD[2], Mahmoud Abdsalam Shakal, BDS, MDS, PHD[3], Sherif Magdy Elsharkawy, BDS, MDS, PHD[4]

Abstract

Statement of problem: ceramic veneers are used to restore deep discolorations or spaced dentition. However, influence of routine of oral hygiene on color stability of ceramic veneers remains unknown.

Purpose: The purpose of this in vivo study was to evaluate the impact of different mouth washes and tooth brushing techniques on color stability of ceramic veneers.

Methods: 30 University Patients were selected to have Zirconia-containing lithium silicate ceramic veneer (ZLS) (**celtra Duo**) then were randomly divided into 3 groups 10 for each group
(n= 10) , as follows: Group 1 participants were instructed to swish with water (control group) ,Group 2 instructed to swish with chlorhexidine based mouthwash(**Hexitol**). Group 3: instructed to swish with Alcohol based mouthwash (**Tantum Verde**). each of which included five people who either did powered (N = 5) or manual (N = 5) tooth brushing for 12 months on a daily basis .The color of the ceramic veneers was examined with Easy Shade following veneer cementation and then compared to subsequent readings at 6 and 12 months. In this study,
Kruskal-Wallis test was used to compare the three groups in each duration independently.

Results: Group 2 showed highly significant change when compared with group 3 &group 1. There was no significant difference between subgroups (A) used manual brushes& subgroups (B) used powered brushes in the same group for each duration months

Conclusion: The chlorhexidine based mouthwash &Alcohol based mouthwash affected the color stability of Zirconia-containing lithium silicate ceramic veneer (ZLS).

Keywords: - Mouth, Washes, Tooth, Brushing, Color, Stability, Ceramic, Veneers.

[1]*Assistant Lecturer Of Fixed Prosthodontics, Faculty Of Dentistry, Tanta University.
[2]professor Of Fixed Prosthodontics, Faculty Of Dentistry, Tanta University.
[3]professor Of Fixed Prosthodontics, Faculty Of Dentistry, Tanta University.
[4]lecturer Of Fixed Prosthodontics, Faculty Of Dentistry, Tanta University.

***Corresponding Author: -** Rana Abdelhameed Elgazar.
*Phone number: +201285801406- +2 040/3345314 The e-mail address: rana_elgazar@dent.tanta.edu.eg

DOI: 10.53555/ecb/2023.12.Si13.252

Introduction

Zirconia is a popular CAD/CAM material that expands while cooling after sintering, potentially leading to cracks propagation. This fracture spread can be avoided by adding a stabilizing material, such as yttrium oxide (Y2O3), to strengthen zirconium oxide. [1] The requirement for a material with both the good mechanical qualities of zirconia and the excellent esthetic attributes of lithium disilicate has resulted in the development of a new material. [2] Because of its unique microstructure, ZLS (zirconia-reinforced lithium silicate) exhibits extraordinary characteristics. The incorporation of 10% atomically dissolved zirconia in the glass phase ensures high strength and long-lasting restorations. By supplying nuclei, zirconia plays an important role in the crystallization process. As a result, a significant amount of lithium silicate is formed, which has excellent light-optical and mechanical properties due to its high glass content. This material now has a higher marginal accuracy and a smooth finish, in addition to its already amazing transparency, opalescence, fluorescence, and chameleon effect. Celtra® Duo becomes handled quickly and efficiently in a dental laboratory in its crystalline form with the natural tooth color.[3] Dentists were hampered by the yellowing of tooth-colored restorative materials. According to studies, plaque growth, solution stains, surface roughness, and chemical degradation caused by beverages and mouthwashes can all influence the color of restorative materials. CHX mouthwashes supplement existing techniques of mechanical caries and periodontal disease prevention and control .[4,5, 6] CHX usage can cause staining of enamel or restorative materials. Most other mouth rinses contain alcohol (in this case, ethanol), which provides the first burning sensation, as well as an unpleasant flavor and dryness of the mouth.[7, 8]

Color changes in restoration can be measured visually or with equipment. Instrumental approaches include. VITA Easy Shade spectrophotometer created exclusively for evaluating the

color of tooth and dental material, was used in this study .[9, 10]

The purpose of this in-vivo study was to see how different oral care practices, such as mouthwashes and tooth brushing, affect the shade of ceramic veneers. Although prior studies has investigated how tooth brushing impacts the surface degradation of restorative materials, there is little data on how toothbrush abrasion affects the optical properties of ceramics. The hypothesis was that chlorhexidine- and alcohol-based mouthwashes effect on the color stability of zirconia containing lithium silicate ceramic veneers.

Material and Methods

This study was conducted as a prospective, randomized clinical trial. The sample size was estimated by using the following formula: - Sample size= $(Z^{2*}(P)^{*}(1-P))/C^{2}$, where z= z value (1.96 for 95% confidence level), p=percentage picking a choice, expressed as a decimal, c= confidence interval, expressed as a decimal. It was calculated that 10 participants per group would provide 95% power with a significance level (0.05). This study was conducted from January 2021 to April 2022 at the out clinics of the faculty of dentistry. Thirty participates (16 females and 14 males) aged 20-45 years had discolored or spaced anterior teeth were selected from those attended to outpatient clinic of fixed prosthodontics department, Faculty of Dentistry.

The clinical outcomes (The values of Color stability were represented by VITA classic scale) then were recorded at the time of ceramic veneer (ZLS) cementation (baseline), at 6 months, and 1 year. The purpose was explained to participants and they received their informed consent. All procedures followed the Declaration of Helsinki established by the World Medical Association.

Inclusion criteria

Patients between the ages of 20 and 45, competent to read and sign the informed permission, medically free, with spaced or discolored anterior teeth that did not react to bleaching, no implants, prosthesis, or dental braces on the investigated teeth, and no periodontal disease [11].

Exclusion criteria

Patient with severe clenching or bruxism, Heavy smokers or drug abusers, had enamel abnormalities , had severe crowding , malpositioning of teeth, poor oral hygiene, periodontitis, severe gingival inflammation or a history of hypersensitivity to any product used in the trial were excluded from the investigation.[12]

Each group contains ten Participates. An online random selection generator was utilized to avoid bias. Ten Participants were instructed to rinse with water (control group), ten Participates were instructed to rinse with chlorhexidine-based mouthwash, and ten Participants were instructed to rinse with alcohol-based mouthwash. Each group was divided into two subgroups, five

Participants in each subgroup. Subgroup A: were instructed to wash their teeth manually, Subgroup B were instructed to use a powered toothbrush.

Preoperative preparation
Accurate intraoral clinical examination, preoperative photographs, digital diagnostic waxing was prepared. Following that, the 3D-printed model was obtained to generate virtual working models using computer software.[13,14] At the start of the consultation, the shade was chosen in different types of light during the day. The fabrication of Functional direct mock up (FDM), which allowed transferring the proposed waxed on3D printed model to the patient's mouth. The usage of a mock-up aids in determining the precise position and quantity of reduction. [15]

Tooth Preparation
A tapered long shank round -end diamond bur (#12) (Microdont, Germany) was used to at least 0.5 mm the margin of the cervical region. Using the depth orientation of the grooves as a guide, the labial surface was prepared with the same diamond bur.[16] Most of the literature advocated retaining the interproximal contact to preserve more enamel and give a positive seat for cementation adhesive method. [17,18] However, in the case of discolored and spaced teeth, proximal preparation was required to conceal the discolored restoration-tooth interface [18]. The incisal edge had 2 mm of tooth preparation removed. For veneer restoration to endure occlusal stress, a palatal finish line was formed 1 mm away from the incisal edge, with its end forming a small chamfer 0.5 mm deep. [19]

Impression
After finishing tooth preparation, applying a retraction cord to make gingival separation as in fig (1), then secondary impression was performed with addition silicone (The Express™ Impression Materials, 3M ESPE, and USA). First, a heavy putty silicone impression of the prepared tooth was made on a stainless steel stock tray, with the retraction cord ensuring sulcular space for the light body impression material. Second, the cord was removed, a light body material was injected onto the prepared tooth and the initial impression was promptly inserted into the patient's mouth.[14]

Provisional Restoration
The silicone index was used to mold a self-curing a bisacrylic resin material in the same morphology of Functional direct mock up (FDM). Until the luting session, the direct provisional restoration was macro mechanically maintained on the prepared teeth.[11]

Restoration fabrication:
Scanning of the prepared surface of each tooth by DOF digital scanner (Metrodent Company, UK).After that merging and saving of the information as STL file .Designing the veneer was done by using Exo-Cad software by choosing the design and the corresponding teeth number then the design was adjusted for each tooth with a standard measurement. STL file was generated to be milled by 5-axis milling machine (coritec 350i pro). Ceramic veneers were milled from celtra CAD CAM blocks (**Celtra Duo , Dentsply Sirona, York, USA)**.The last stage was handfinishing of the veneers for contacts and occlusion then hand polishing for natural surface texture.

Try in of veneers
Careful checking marginal adaptation, contour and shade match of veneers inside the patient mouth. Using water as try in past to check the shade of veneers. If water try in looks good, we would use translucent cement to seat restorations. If the color was not appropriate, as in discolored teeth, we would start trying some of colored try in past (try in past. Choice™ 2. BISCO, U.S.A.) to decide which cement color to utilize.[20]

Cementation of Veneers
At first, appropriate isolation by using rubber dam then cleaning and drying teeth with water as in fig (2). Etching the tooth surface for 30 seconds with self-etch for enamel 37% phosphoric acid (Acid etch, Coltene/Whaledent , Switzerland) then rinsed for 20 seconds . universal bond (All-Bond Universal ,BISCO, U.S.A.) was applied to etched tooth surface for 20 seconds before being lightly air thinned for 5 seconds to allow the solvents to evaporate.[21]
The inside surfaces of the ceramic veneer were conditioned by using 9.5 % hydrofluoric acid (Porcelain etchants, BISCO, U.S.A) gel for 20 seconds. For 30 seconds, The veneers washed thoroughly with air/water spray . After drying veneers , silane applied (Porcelain primmer , BISCO, U.S.A) .Following silane evaporation ,a small amount of translucent shade light cured resin cement (Choice™ 2, light-cured luting agent BISCO, U.S.A)was administered directly on the inside surface of the veneers. The veneers were seated on the prepared tooth and the residual cement was removed. Veneers were light-cured at the facial and lingual sides for 40 seconds on each side.[22] Once the rubber dam was removed, the occlusal relationship was evaluated by selective

grinding with articulating paper in maximum intercuspation, lateral and protrusive movement.[23]

After veneers cementation

Begin a clinical evaluation of the restorations' quality after 10 days following veneer cementation(shade match, marginal gap, marginal fracture, loss of retention, hypersensitivity, and deboning)[16,23] as in fig (3). Second, we tested the color stability of the restorations by measuring the color of the ceramic veneers with Easy Shade (VITA Easyshade, spectrophotometer, VITA Zahnfabrik, Bad Sackingen, Germany) as in fig (4). All of the research groups' color stability values were recorded using the VITA classic scale for further comparison.[24,25] Veneer color was determined with the use of a handheld clinical spectrophotometer (Vita Easy shade). The contact probe tip was held at a right angle to the surface and contacted the center middle third of the veneer. The screen would display the closest Vita shade using the standard and 3D shade guide designations.[26,27] Then were recorded as veneers shade at the time of ceramic veneer (ZLS) cementation (baseline) to be compared with next readings at 6 months, and 1 year.

Following randomization, all participants were given the identical toothpaste. The participants were given instructions for manual, powered brushing, and tested mouth rinses. Participants randomly divided into three groups (control group, group asked to rinse with chlorhexidine based mouthwash and group asked to rinse with Alcohol based mouthwash.[28,29]

Follow up 6 & 12 months postoperatively:

Participants were clinically assessed 6 and 12 months postoperatively after using various mouth washes and tooth brushing techniques. The shade of the ceramic veneers was then checked and documented using Easy Shade. Color stability values were expressed using the VITA classic scale and recorded on all research groups as previously described, to be compared with prior measurements to determine their effect on the color of the ceramic veneers with Easy Shade at 6 and 12 months postoperatively. [30,31]

Statistical analysis

For our statistical analysis, we employed SPSS (IBM SPSS Statistics version 26). Nominal variables were expressed using frequency and percentage. The Friedman test was used to indicate statistical significance when comparing times within the same group, but the Wilcoxon test was used to show statistical significance between every pair of times within the same group. The Mann-Whitney U test was used within each time period to assess differences between subgroups within the same group. Finally, the Kruskal-Wallis test was used to compare the differences between the three groups across time. When two groups were compared, a P value of less than 0.05(*) was considered statistically significant, and a P value of less than 0.001(**) was considered extremely significant.

Result

Color stability values were expressed by using VITA classic scale and recorded for all study groups. The frequency and percentage of nominal variables were given, accompanied by the P value of all study groups. Color stability was evaluated at cementation, 6 months later, and 12 months later. It was observed that after 6 months of using (chlorhexidine based mouthwash), both subgroups (A&B) in Group 2 Color stability record slightly altered, and then after 12 months of using (chlorhexidine based mouthwash) Color stability record changed significantly. While the color stability record of both subgroups (A&B) in Group 3 remained the same after 6 months, it started changing after 12 months of using (Alcohol-based mouthwash). However, the color stability record of both subgroups (A&B) in Group 1 (control) did not alter after 6 months or 12 months as in table (1) & table (2). The Kruskal Wallis test was performed to compare the three groups in each time period separately. As in table (1), P value 0.05(*) was regarded a significant difference, while P-value 0.001(**) was considered a highly significant difference (2). Mann Whitney the U test was used to demonstrate the difference between subgroups within the same group for each duration month. There was no difference between subgroups (A) that used manual brushes and subgroups (B) that used powered brushes within the same group for each duration month. In the study, manual and powered brushes in the same group had the same effect on ceramic veneers. as in table (3).

Discussion

There are few studies on the effect of various dental health habits, including as mouthwashes and brushing regimens on the shade of ceramic veneers. According to the current study's findings, a difference with a P value of less than 0.05(*) was considered significant and a difference with a P value of less than 0.001(**) was considered highly significant. When compared the control group to the groups using alcohol-containing mouthwashes and the CHX group, The CHX group showed the most significant color change. There was no statistically significant difference between cleaning by hand (subgroup A) and by power tool (subgroup B) within each group.

Brushing continuously caused the surface of the restorations to become rougher, which led to discoloration. The smooth surface aids in the redirection of light that reflects at the same angle. This phenomenon is described by specular reflection. The surface of teeth is frequently roughened as a result of the complicated interplay between oral fluids and tooth abrasion, enabling light to reflect in multiple directions. [32, 33]This study's findings are consistent with earlier research investigating the impact of tooth brushing on restorative surfaces. These studies found a clear impact of toothbrush abrasion on the optical properties of hybrid resin ceramic and glass-ceramic materials. [34, 35, 36]

In controversy*, in vitro* studies showed when the same brushing force was used for power and manual toothbrushes. The frequency of brushing movements is higher in manual vs. activated power toothbrushes. Also, the abrasive effect of tooth brushing depends on the direction of the brushing movement, applied force of brushing as well as quality and arrangement of the toothbrush bristles. When comparing manual and activated power toothbrushes, manual toothbrushes have a higher frequency of brushing movements. [36, 37, 38]

The chlorhexidine group demonstrated a highly significant change in color stability of ceramic veneers at 6 and 12 months postoperatively in this investigation. The usage of chlorhexidine mouthwash for an extended period of time induced brown staining on teeth and various restorative materials. Discoloration of teeth and repairs can be traced back to the formation of colorful metal sulfide via a non-enzymatic browning process. These findings supported previous in vitro findings that the coloring was caused by the precipitation of dietary chromogens and locally adsorbed chlorhexidine. As shown in these studies, different ceramic materials discolored as a result of hydrothermal age and continuous use of chlorhexidine mouthwash. [7,9,39,40]

On the other hand, Changes in color stability of ceramic veneers in the alcohol group after 12 months can be related to ethanol, which has a softening impact on the restorative material. According to previous studies, long term exposure to mouthwash with higher alcohol content in the oral environment increased surface roughness, altered the direction of light reflection, and compromised the surface morphology of bio ceramics even more by vigorous brushing. Several studies have shown that surface roughness has a significant impact on the optical properties and contrast sensitivity of dental restorations. [6,8, 40 , 41]

Soygun et al [42], who evaluated three bio ceramic materials (IPS Empress) CAD, (celtra) CAD, and Lava Ultimate CAD with three commercial mouth rinses (Listerine, Tantum Verde, and Klorhex-Dexcel®), sparked controversy. A spectrophotometer was used to measure the change in surface translucency. Translucency changed when both (IPS Empress) CAD and (celtra) CAD were immersed in Klorhex-Dexcel® (chlorhexidine mouthwash). There was no substantial difference after they were submerged in Listerine (alcohol mouthwash).

Another study by Alencar-Silva FJ et al [43] found that the characteristics of CAD-CAM lithium disilicate ceramic were impacted. It degrades after being exposed to routinely used mouth rinses, resulting in decreased micro hardness, increased surface roughness, and minor color changes. Although tooth brushing did not increase or decrease the observed effects.

Despite many researches were conducted to investigate the impact of different mouth washes and tooth brushing approaches on the color stability of ceramic veneers. Unfortunately, there is no special prescription for the best mouthwashes and tooth brushing techniques when using ceramic veneers. The current study's hypothesis supported that chlorhexidine-based mouthwash and alcohol-based mouthwash altered the color of (ZLS) ceramic veneer. In the study, manual brushes and powered brushes in the same group had the same effect on ceramic veneers.

The short-term follow-up of this study are among the study's limitations. In this in-vivo investigation, only two types of mouth rinses (alcohol-based and alcohol-chlorhexidine containing mouth rinse) were examined. More research on the effect of these mouth rinses on various ceramic materials may be recommended.

Conclusions

Based on the current findings, we have reached the following conclusions:

The color shift in the tested ceramic material was caused by all of the mouth rinses examined in this clinical investigation; however the color shift varied depending on the time and chemical content of the mouth rinse.

After 6 and 12 months of using (chlorhexidine-based mouthwash), the color change of tested ceramic laminate veneers was recorded, with a significant variation between durations in the same group.

After 12 months of use (Alcohol-based mouthwash), the color change of tested ceramic laminate veneers was recorded, indicating a significant difference between durations in the same group.
There was no significant difference between cleaning by hand and power brush.

Clinical implication
Alcohol based mouthwash is the proper mouthwash to be used for patients with zirconia reinforced lithium silicate ceramic restoration when compared with chlorhexidine mouthwash, because CHX mouthwash has more significant effect on the color stability of ZLS veneer. There was no significant difference between cleaning by hand or power brush in this study.

Declarations Section
Authors' contributions
R A and S E: Study conceptualization. R A manuscript writing. RA and S E: Data collection and entry. M S and GM: Supervision. R A: Data curation. The final draft was reviewed and approved by all authors.

Ethics Approval and Consent to Participate
Tanta University's Faculty of Dentistry's Research Ethics Committee (approval number FP-0121-1) gave its stamp of approval to the project. All procedures followed the Declaration of Helsinki established by the World Medical Association. The purpose was explained to participants and they received their written informed consent.
Funding: No funding. This research did not receive any specific grant from funding agencies in the public, commercial, or not for profit sectors.
Conflict of interest: The authors of this research have no financial or personal conflicts of interest.

References
1. Alfawaz Y. Zirconia crown as single unit tooth restoration: a literature review. journal of Contemp Dent Pract 2018;17:418-22.
2. Lawson NC, Bansal R, Burgess JO. Wear, strength, modulus and hardness of CAD/CAM restorative materials. Dental Materials 2018;32: 275-83.
3. Ozera EH, Pascon FM, Correr AB, et al. Color stability and gloss of esthetic restorative materials after chemical challenges. Brazilian dental journal 2019;30:52-57.
4. Burgess JO, Ghuman T, Cakir D, Swift J, Edward J. Self-adhesive resin cements. Journal of esthetic and restorative dentistry 2020;22:412-19.
5. Pissaia JF, Guanaes BKdA, Kintopp CCdA, et al. Color stability of ceramic veneers as a function of resin cement curing mode and shade: 3-year follow-up. PloS one 2019;14: 219183.
6. Baig AR, Shori DD, Shenoi PR, et al. Mouthrinses affect color stability of composite. Journal of conservative dentistry: The journal of contemporary dental practice 2016;19:355.
7. Fonseca BM, Barcellos DC, Pucci CR, Bresciani E. Influence of chlorhexidine on longitudinal bond strength to dentin: in vitro study. Brazilian Dental Science 2018;20:17-24.
8. Haralur SB, Alqahtani RS, Alhassan Mujayri F. Effect of hydrothermal aging and beverages on color stability of lithium disilicate and zirconia based ceramics. Medicina 2019;55:749.
9. Bagis B, Baltacioglu E, Oezcan M, Ustaomer S. Evaluation of chlorhexidine gluconate mouthrinse-induced staining using a digital colorimeter: an in vivo study. Quintessence International 2021;42.
10. Lehmann KM, Devigus A, Igiel C, et al. Are dental color measuring devices CIE compliant. European Journal of Esthetic Dentistry 2020;7.
11. Marchionatti AME, Wandscher VF, May MM, Bottino MA, May LG. Color stability of ceramic laminate veneers cemented with light-polymerizing and dual-polymerizing luting agent: A split-mouth randomized clinical trial. The Journal of prosthetic dentistry 2017;118:604-10.
12. Alenezi A, Alsweed M, Alsidrani S, Chrcanovic BR. Long-Term Survival and Complication Rates of Porcelain Laminate Veneers in Clinical Studies: A Systematic Review. Journal of clinical medicine 2021;10:10-74.
13. da Cunha LF, Prochnow RA, Costacurta AO, Gonzaga CC, Correr GM. Replacement of anterior composite resin restorations using conservative ceramics for occlusal and periodontal rehabilitation: an 18-month clinical follow-up. Case reports in dentistry 2019;18:60-74.
14. Silva G, Normandes AC, Barros Júnior E, et al. Ceramic Laminate Veneers for Reestablishment of Esthetics in Case of Lateral Incisor Agenesis. Case reports in dentistry 2018;29: 31-35.

15. Bernardon P, Lagustera CE, Manhães Junior LRC, et al. Correction of Vertical Smile Discrepancy through Ceramic Laminate Veneers and Surgical Crown Lengthening. Case reports in dentistry 2019;17:43.
16. Gresnigt MM, Cune MS, Schuitemaker J, et al. Performance of ceramic laminate veneers with immediate dentine sealing: An 11 year prospective clinical trial. Dental Materials 2019;35: 42-52.
17. Alavi AA, Behroozi Z, Eghbal FN. The shear bond strength of porcelain laminate to prepared and unprepared anterior teeth. Journal of Dentistry 2017;15: 18:50.
18. Peris H, Godoy L, Cogolludo PG, Ferreiroa A. Ceramic veneers on central incisors without finish line using bopt in a case with gingival asymmetry. Journal of clinical and experimental dentistry 2019;11: 577.
19. Oliveira Jr OFd, Kunz PVM, Baratto Filho F, et al. Influence of pre-curing different adhesives on the color stability of cemented thin ceramic veneers. Brazilian dental journal 2019;30:259-65.
20. Layton DM, Clarke M, Walton TR. A systematic review and meta-analysis of the survival of feldspathic porcelain veneers over 5 and 10 years. International Journal of Prosthodontics 2018;25.
21. Alnakib Y, Alsaady A. Influence of ceramic and substrate types on the microleakage of aged porcelain laminate veneers. Clinical, Cosmetic and Investigational Dentistry 2021;13:67.
22. Aslan YU, Uludamar A, Özkan Y. Clinical performance of pressable glass-ceramic veneers after 5, 10, 15, and 20 years: A retrospective case series study. Journal of Esthetic and Restorative Dentistry 2019;31:415-22.
23. Imburgia M, Cortellini D, Valenti M. Minimally invasive vertical preparation design for ceramic veneers: a multicenter retrospective follow-up clinical study of 265 lithium disilicate veneers. Int J Esthet Dent 2021;14:286-98.
24. Perroni AP, Bergoli CD, Dos Santos MBF, Moraes RR, Boscato N. Spectrophotometric analysis of clinical factors related to the color of ceramic restorations: A pilot study. The Journal of prosthetic dentistry 2017;118:611-16.
25. Kalantari MH, Ghoraishian SA, Mohaghegh M. Evaluation of accuracy of shade selection using two spectrophotometer systems: Vita Easyshade and Degudent Shadepilot. European journal of dentistry 2020;11:196.
26. Glockner K. Visual vs. Spectrophotometric methods for shade selection. Collegium antropologicum 2015;39:801-02.
27. Elamin HO, Abubakr NH, Ibrahim YE. Identifying the tooth shade in group of patients using Vita Easyshade. European journal of dentistry 2021;9:213.
28. Kim H-K. Evaluation of the repeatability and matching accuracy between two identical intraoral spectrophotometers: an in vivo and in vitro study. The journal of advanced prosthodontics 2019;10:252-58.
29. Rosema N, Slot D, van Palenstein Helderman W, Wiggelinkhuizen L, Van der Weijden G. The efficacy of powered toothbrushes following a brushing exercise: a systematic review. International journal of dental hygiene 2019;14:29-41.
30. Guignone BC, Silva LK, Soares RV, et al. Color stability of ceramic brackets immersed in potentially staining solutions. Dental press journal of orthodontics 2019;20:32-38.
31. Gugelmin BP, Miguel LCM, Baratto Filho F, et al. Color stability of ceramic veneers luted with resin cements and pre-heated composites: 12 months follow-up. Brazilian dental journal 2020;31:69-77.
32. Lee J-H, Kim S-H, Han J-S, Yeo I-SL, Yoon H-I. Optical and surface properties of monolithic zirconia after simulated toothbrushing. Materials 2019;12:11-58.
33. Yuan JC-C, Barão VAR, Wee AG, et al. Effect of brushing and thermocycling on the shade and surface roughness of CAD-CAM ceramic restorations. The Journal of prosthetic dentistry 2021;119:10-6.
34. Petker W, Weik U, Margraf-Stiksrud J, Deinzer R. Oral cleanliness in daily users of powered vs. manual toothbrushes–a cross-sectional study. Journal of the Mechanical Behavior of Biomedical Materials 2019;19:1-9.
35. Labban N, Al Amri M, Alhijji S, et al. Influence of toothbrush abrasion and surface treatments on the color and translucency of resin infiltrated hybrid ceramics. The Journal of

Advanced Prosthodontics 2021;13:1.

36. AlAli M, Silikas N, Satterthwaite J. The Effects of Toothbrush Wear on the Surface Roughness and Gloss of Resin Composites with Various Types of Matrices. Dentistry Journal 2021;9:8.

37. Deinzer R, Ebel S, Blättermann H, Weik U, Margraf-Stiksrud J. Toothbrushing: to the best of one's abilities is possibly not good enough. BioMedCentral oral health 2018;18:1.
38. Klonowicz D, Czerwinska M, Sirvent A, Gatignol J-P. A new tooth brushing approach supported by an innovative hybrid toothbrush-compared reduction of dental plaque after a single use versus an oscillating-rotating powered toothbrush. BioMed Central Oral Health 2019;18:185.
39. Loguercio AD, Hass V, Gutierrez MF, et al. Five-year effects of chlorhexidine on the in vitro durability of resin/dentin interfaces. J Adhesion dentistry 2016;18:35-42.
40. Soygun K, Varol O, Ozer A, Bolayir G. Investigations on the effects of mouthrinses on the colour stability and surface roughness of different dental bioceramics. The journal of advanced prosthodontics 2017;9:200-07.
41. Alencar-Silva FJ, Barreto JO, Negreiros WA, et al. Effect of beverage solutions and toothbrushing on the surface roughness, microhardness, and color stainability of a vitreous CAD-CAM lithium disilicate ceramic. The Journal of prosthetic dentistry 2020;121:711.
42. Derafshi R, Khorshidi H, Kalantari M, Ghaffarla I. Effect of mouthrinses on color stability of monolithic zirconia and feldspathic ceramic: an in vitro study; The Journal of prosthetic dentistry 2017;7:1.
43. Hamdan-Nassar T, Bellot-Arcís C, Paredes-Gallardo V, et al. Effect of 2% chlorhexidine following acid etching on microtensile bond strength of resin restorations: a meta-analysis; Medicina 2020;55:769.

Tables

Table (1) Comparison Color stability record between subgroups (A) in the each group for each duration

Subgroup A (manual brushing)	Score	Group 1 N (%)	Group2 N (%)	Group 3 N (%)	Kruskal-Wallis H test P-value
	A1	0(0%)	5(100%)	5(100%)	14.000
	A2	5 (100%)	0(0%)	0(0%)	(0.001*)
At cementation	B1	0(0%)	0(0%)	0(0%)	
	B2	0(0%)	0(0%)	0(0%)	
	C1	0(0%)	0(0%)	0(0%)	
	A1	0(0%)	0(0%)	5(100%)	
	A2	5 (100%)	0(0%)	0(0%)	13.592
After 6 months	B1	0(0%)	3(60%)	0(0%)	(0.001*)
	B2	0(0%)	2(40%)	0(0%)	
	C1	0(0%)	0(0%)	0(0%)	
	A1	0(0%)	0(0%)	0(0%)	
	A2	5 (100%)	0(0%)	0(0%)	13.592
After 12 months	B1	0(0%)	0(0%)	5(100%)	(0.001*)
	B2	0(0%)	3(60%)	0(0%)	
	C1	0(0%)	2(40%)	0(0%)	

Table (2) Comparison Color stability record between subgroups (B) in the each group for each duration

(powered brushing)	Score	Group 1 N (%)	Group2 N (%)	Group 3 N (%)	Kruskal-Wallis H P-value
	A1	0(0%)	5(100%)	5(100%)	14.000
	A2	5 (100%)	0(0%)	0(0%)	(0.001*)
At cementation	B1	0(0%)	0(0%)	0(0%)	
	B2	0(0%)	0(0%)	0(0%)	
	C1	0(0%)	0(0%)	0(0%)	
	A1	0(0%)	0(0%)	5(100%)	
	A2	5 (100%)	0(0%)	0(0%)	13.592
After 6 months	B1	0(0%)	3(60%)	0(0%)	(0.001*)
	B2	0(0%)	2(40%)	0(0%)	
	C1	0(0%)	0(0%)	0(0%)	
	A1	0(0%)	0(0%)	0(0%)	
	A2	5 (100%)	0(0%)	0(0%)	13.592
After 12 months	B1	0(0%)	0(0%)	5(100%)	(0.001*)
	B2	0(0%)	3(60%)	0(0%)	
	C1	0(0%)	2(40%)	0(0%)	

Subgroup B

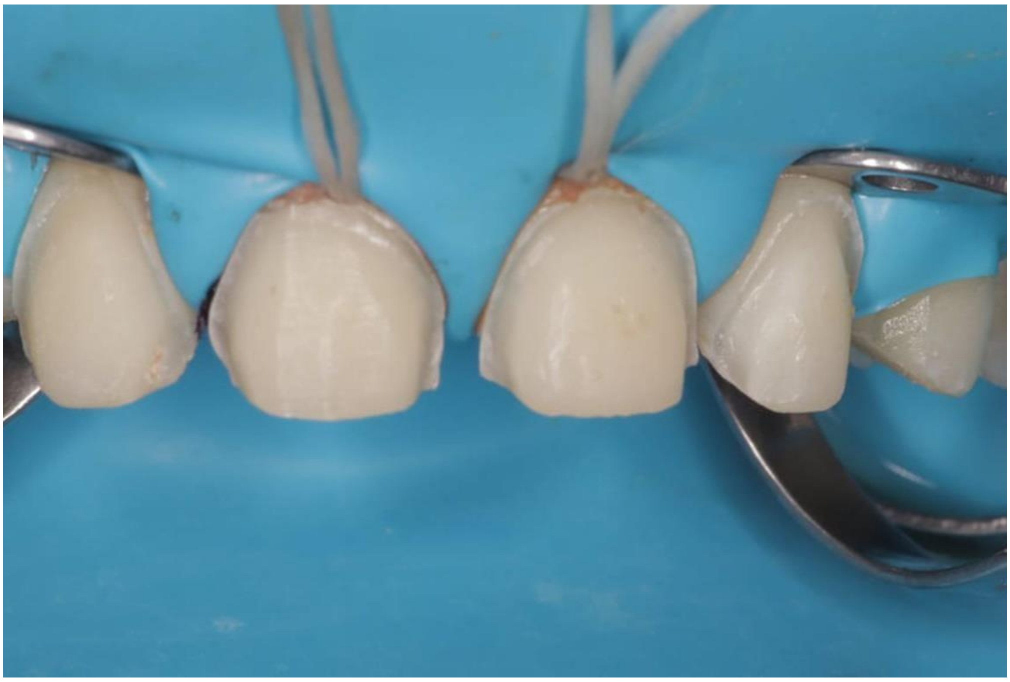
Table (3) Comparisons between different studied groups as regard to Color stability record showing P-value.

Subgroup A(manual

Group 1 vs. Group2 brushing)		Group 1 vs. Group3	Group 2 vs. Group3
At cementation	0.008*	0.008*	1.000
After 6 months	0.008*	0.008*	0.008*
After 12 months	0.008*	0.008*	0.008*
Subgroup B(powered brushing)			
At cementation	0.008*	0.008*	1.000
After 6 months	0.008*	0.008*	0.008*
After 12 months	0.008*	0.008*	0.008*

FIGURES

(Fig 1).



(Fig 2).

(Fig 3).

(Fig 4).

Legend to figures

(Fig 1)	**Finishing tooth preparation, applying a retraction cord**
(Fig 2)	**Isolation by using rubber dam before Cementation of Veneers**
(Fig 3)	**Clinical evaluation of veneers 10 days following veneer cementation**
(Fig 4)	**Application of VITA Easy Shade**