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Evaluating the color stability of two esthetic ceramic materials after different surface treatments and accelerated aging procedures

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Abstract

Aim: The aim of this study was to observe and evaluate the long- and short-term discoloration tendencies of lithium disilicate-based glass-ceramics (IPS e.max CAD LT) and leucite-based feldspathic glass-ceramics (VITA Mark II) materials, which are esthetically very close to each other at first glance.
Methodology: 80 pieces of lithium disilicate and feldspathic blocks (A2 colored) were overglazed and polished separately to evaluate the surface treatment procedures according to CIELAB color coordinates. For accelerated aging purposes, half of the samples were treated with red wine, and the other half were treated with coffee. Color changes were calculated using the ΔE formula. The results were represented as ΔE-1, ΔE-2, and ΔE-3. Data distribution regarding numerical variety and changes was evaluated using the Shapiro-Wilk normality test and Q-Q graphics.
Results: The data was evaluated using O'Brien clinical color tolerance scales. After 4 weeks of accelerated aging, any of the samples did not show a perfect (ΔE=0-0.5) color match. Both groups have shown significant statistical changes at various rates and percentages.
Conclusion: Since aging procedures affect ceramic systems' ΔE values in a variety of ways, the aging protocol utilizing in vitro aging techniques for color change should be evaluated alongside ceramic type and surface finishing procedures.

Keywords: CIELAB, dental discoloration, Emax, Empress, surface treatments, aging

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Introduction

Full ceramic restorations have become more popular in many applications due to their excellent aesthetic appeal and biocompatibility. Substructures such as alumina, zirconia, glass ceramics, and veneer porcelain strengthen their mechanical properties (1). A variety of glass-ceramic and polycrystalline-based full ceramic restorations were adapted by many dentists due to their high endurance for bending, biocompatibility, and esthetical value. With CAD-CAM technology, these materials can also be used by clinicians to create complex ceramic restoration forms like inlays and onlays using more simple ceramic blocks, offering a fast treatment option for their patients (2).

In terms of esthetic factors and plaque retention, porcelain surfaces need to be as smooth as possible. As a result of a variety of finishing techniques, it is possible for porcelain to esthetically mimic the natural tooth enamel and strengthen its fragile composition (3). A glossy surface should be accomplished to prevent erosion of the antagonist teeth and to increase the long-term success of prosthetics (4). Surface treatment can be applied in two ways. In the overglazing (glazing) method, low melting temperature glass is applied to the ceramic surface and receives heat treatment. However, mechanical polishing (polishing) is performed with different grains of abrasives, rubber, discs, etc., in low-speed micromotors (5). Many CAD-CAM glass-ceramic restorations cannot be cemented without glazing procedures after milling. However, lithium disilicate and feldspathic glass ceramic groups can be finished and cemented with mechanical polish without applying an external glaze.

Aging is the general name for studies of in vitro testing of the physical effects of long-term clinical usage of dental materials in a shorter period of time in a controlled environment. Accelerated aging has various forms, such as thermal cycling and autoclave aging (6). Accelerated aging is a test type using light, moisture, temperature, or force in an enclosed or open environment to test materials' color and durability (7). According to the manufacturing companies, 300 hours of aging procedure equals one year in a mouth.

In most dental studies, the CIELAB system is commonly used to quantify color and color change. This system calculates the color change (ΔE) based on variations in lightness-darkness and red-green and blue-yellow coordinates. Specifically, + L* represents lightness, − L* represents darkness, + a* represents red, − a* represents green, + b* represents yellow, and − b* represents blue (Fig. 1) (8).

Multi-sensor systems are used to detect colors that cannot be perceived by the human eye. The measurement is done by scaling the light reflecting from a colored surface to a light reflecting from a white surface. Since sunlight, light bulbs, and fluorescent light might result in different readings, it is the preferred method of measurement in professional fields, scientific studies, and quality assurance fields (9).

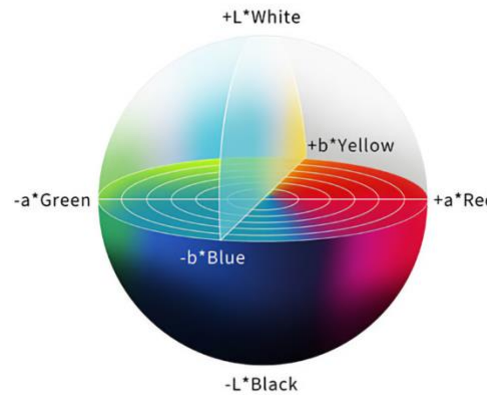

Figure 1. CIELAB RGB color model

The aim of this study was to observe and evaluate the long/short-term discoloration tendencies of lithium disilicate-based glass-ceramics (IPS e.max CAD LT) and leucite-based feldspathic glass-ceramics (VITA Mark II) materials.

Materials and Methods

In the study, 80 samples were split equally into groups as glazed and mechanical polished ceramic samples and were placed in wine or coffee for 30 days, or 720 hours. This time equals 2.4 years in a mouth.

In this study, the glass-ceramic IPS e.max CAD (Ivoclar Vivadent®, Schaan, Liechtenstein) containing lithium disilicate and the feldspathic glass ceramic VITA Mark II (Vita Zahnfabrik, Bad Säckingen, Germany) containing leucite were prepared to create 80 samples (14x14x1.5 mm) IPS e.max samples were fired at 850°C for 20 to 30 minutes to finish their crystallization process and turn their color from purple-blue to natural teeth color. To establish standardization before the surface finishing procedures, all samples were sanded with a sanding machine (Phoenix Beta, Buehler, USA) at 300 rpm with water-cooling using 320, 400, 600, and 1200 grids for 20 seconds each.

Both ceramic groups were divided into two groups within themselves. In glazing, Vita Akzent (VITA Zahnfabrik®) for Vita Mark II samples; and Ivoclar (Ivoclar Vivadent®) for IPS e.max CAD LT samples were chosen as glazing paste and liquids, respectively. The paste and liquids were mixed on a thin sheet of glass plates and applied at a homogenous level on samples by single personnel. Air bubbles were carefully removed. Samples were placed on a plate, put through firing, and then glazed according to the companies' instructions. The glazing procedure was concluded after the samples were cooled.

The mechanical polishing procedure was applied to other ceramic groups. Luster® series LUS100 polishing kit by Meisinger was used. Brown and yellow polishing discs were applied for 30 seconds at the setting of 1000 revelations with the assistance of a cooling device (NSK S-Max M65) to represent the human mouth. The application was undertaken by a single operator (D.G.), using finger pressure (2 N) in rotational and linear movements. For IPS e.max CAD samples, the Optrafine Kit was utilized alongside water spraying for 30 seconds to finish ceramic surfaces and make adjustments. Then, the polishing of surfaces was performed with a polishing disc (P) again, a nylon water spraying. Finally, diamond paste and a nylon brush (HP) were used for 60 seconds for a high polish procedure without water spraying.

Two different surfaces finishing works were applied to two different complete ceramic block groups, which were followed by the first color measurement tests. Then, the groups were separated into two groups for aging in red wine (Kavaklıdere Angora Red 2018; Ankara, Turkey) and coffee (Jacobs Monarch Gold Stick; JDE, the Netherlands) (n=10). Eight groups and 80 samples were recorded. The wine was kept at room temperature. Plain bean coffee was brewed in 200 ml of hot water for 5 minutes. The samples were lowered to a temperature of 37°C and kept at room temperature the whole day. Liquids were replaced daily by the same person.

A VITA Easyshade® spectrophotometer was used to measure the color of the samples. Under phototaxic stable light on a solid white background, each sample was measured before and after the device's recalibration. The measurements were performed immediately after surface treatment (T0), on the first day of the aging procedure (T1), at the first week (T2), and at the first month (T3). Before each measurement, the samples were removed from the liquids, cleaned using lukewarm water, and dried before testing. Three different points were chosen to establish a standard for spectrophotometer measurements.

L*, a*, and b* were used as three variables. In three-dimensional color space, L, a, and b axes intersect. L* axis represents the shine, whether a color is light or dark. It gives a dark coordinate value between white (+) and black (-). Darkest is given a value of zero, while the lightest value closest to white is given a value of 100 L. a* gives the chroma (density) coordinate values on a horizontal scale between red (+) and green (-). b* gives the chroma (density) coordinate values on a horizontal scale between yellow (+) and blue (-) (Fig. 2) (10).

To detect ΔE color differences, coordinates of L*, a*, and b* were determined in a 3-dimensional environment in CIELAB color space. ΔE was calculated with the following formula;

$$\Delta E^* = [(L1^* - L2^*)^2 + (a1^* - a2^*)^2 + (b1^* - b2^*)^2]^{½}$$

Using Microsoft® Excel, the formula was used to determine the color change spectrum on measurements taken on day one, week one, and month one and were remarked as ΔE-1, ΔE-2, and ΔE-3. Samples' color, hue, and chroma values were also put into the record on the VITA Classic scale.

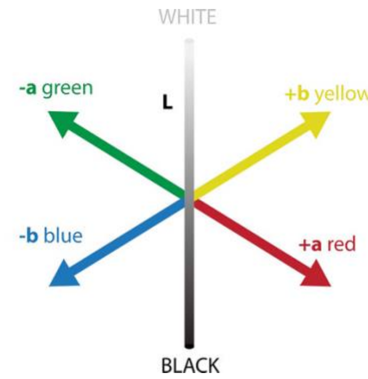

Figure 2. CIELAB color space

Statistical analysis

Analyses were performed using SPSS software (IBM SPSS Statistics version 25, IBM Inc., Armonk, NY, USA). The significance level was set at $p < 0.05$.

Data distribution regarding numerical variety and changes was evaluated using the Shapiro-Wilk normality test and Q-Q graphics.

Results

The results of the accelerated aging procedure from day one, week one, and month one were compared to the data from the initial evaluation. Color changes were calculated using the ΔE formula. The results were recorded as ΔE-1, ΔE-2, and ΔE-3 (Tables 1-a, b, c).

After day one, for ΔE-1 values in the excellent category (ΔE=0.5-1), the IPS e.max CAD LT glazed and polished- wine group's consistency values were statistically higher compared to VITA Mark II glazed and polished- coffee groups. In the clinically acceptable category (ΔE=2-3.5), IPS e.max CAD LT polished-coffee-VITA Mark II glazed and polished-coffee consistencies were statistically above IPS e.max CAD LT glazed and polished-wine groups.

At week one measurement, only IPS e.max CAD LT glazed coffee samples' 10% had shown a perfect color change. In the excellent category (ΔE=0.5-1), the IPS e.max CAD LT glazed-wine group is represented with 20%. In the good category (ΔE=1-2), the best consistency was seen in the IPS e.max CAD LT glazed- wine group with a 70% sample rate and statistically ahead of IPS e.max CAD LT glazed- coffee (10%) and VITA Mark II (20-10-0-10%) groups. In the clinically acceptable category (ΔE=2.5-3), the least consistency was seen in the IPS e.max CAD LT glazed-wine group with 0%, and it is statistically unique compared to other groups. In this category, the highest value was seen at IPS e.max CAD LT glazed- coffee group at 70%. In the incompatible category (ΔE>3.5), the least consistency was seen at IPS e.max CAD LT polished- wine group at 0%, and is different from VITA Mark II groups.

Table 1-a. Comparison of clinical color matching tolerance values of ΔE-1 categories based on groups

Experiment Layout			ΔE-1 Categories										Test Statistics **	
Material	Surface Finishing	Aging Method	Perfect		Excellent		Good		Acceptable		Incompatible			
			n	%	*n*	%	*n*	%	*n*	%	*n*	%	x^2	*p*
E. MAX CAD LT	Glaze	Wine	0	0.0	5^{a}	50.0	5	50.0	0^{a}	0.0	0	0.0	46.560	<0.001
		Coffee	0	0.0	1^{ab}	10.0	7	70.0	2^{ab}	20.0	0	0.0		
	Polish	Wine	0	0.0	4^{a}	40.0	6	60.0	0^{a}	0.0	0	0.0		
		Coffee	0	0.0	1^{ab}	10.0	5	50.0	4^{b}	40.0	0	0.0		
VITA MARK II	Glaze	Wine	1	10.0	1^{ab}	10.0	4	40.0	2^{ab}	20.0	2	20.0		
		Coffee	0	0.0	0^{b}	0.0	3	30.0	4^{b}	40.0	3	30.0		
	Polish	Wine	0	0.0	1^{ab}	10.0	7	70.0	1^{ab}	10.0	1	10.0		
		Coffee	0	0.0	0^{b}	0.0	3	30.0	4^{b}	40.0	3	30.0		

a and *b* superscripts show the difference between groups in each category.

Table 1-b. Comparison of clinical color matching tolerance values of ΔE-2 categories based on groups

Experiment Layout			ΔE-2 Categories										Test Statistics **	
Material	Surface Finishing	Aging Method	Perfect		Excellent		Good		Acceptable		Incompatible			
			n	%	*n*	%	*n*	%	*n*	%	*n*	%	x^2	*p*
E. MAX CAD LT	Glaze	Wine	0	0.0	2	20.0	7^{a}	70.0	0^{a}	0.0	1^{ab}	10.0	46.566	<0.001
		Coffee	1	10.0	0	0.0	1^{bc}	10.0	7^{b}	70.0	1^{ab}	10.0		
	Polish	Wine	0	0.0	1	10.0	5^{ac}	50.0	4^{b}	40.0	0^{b}	0.0		
		Coffee	0	0.0	0	0.0	3^{abc}	30.0	5^{b}	50.0	2^{ab}	20.0		
VITA MARK II	Glaze	Wine	0	0.0	0	0.0	2^{bc}	20.0	4^{b}	40.0	4^{a}	40.0		
		Coffee	0	0.0	0	0.0	1^{bc}	10.0	4^{b}	40.0	5^{a}	50.0		
	Polish	Wine	0	0.0	1	10.0	0^{b}	0.0	5^{b}	50.0	4^{a}	40.0		
		Coffee	0	0.0	0	0.0	1^{bc}	10.0	5^{b}	50.0	4^{a}	40.0		

a and *b* superscripts show the difference between groups in each category.

After the first month, VITA MARK II polish Wine A values were higher compared to other groups. All samples were taken in redder colors, as shown by an increase in the CIE Lab color coordinates' a* values. On b* values, all samples that were treated with wine had shown statistically lower results on month one measurements compared to previous measurements on the spectrum, and the other differences between other measurement values are considered insignificant. All samples that were aged using coffee yielded smaller values on measurements statistically, and differences between other measurement values are considered insignificant.

In internal ΔE group comparisons, IPS e.max CAD LT glazed- wine and VITA Mark II polished coffee had higher statistical ΔE-3 values than ΔE-1 and ΔE-2 values; ΔE-1 and ΔE-2 values had no significant differences. IPS e.max CAD LT glazed and polished coffee, VITA Mark II glaze coffee ΔE values, in terms of statistical differences, are considered insignificant. VITA Mark II polished- wine ΔE values show a significant difference in-between. ΔE-3 values are the highest in this group. When the test statistics were examined for in-group changes, VITA Mark II polish wine, VITA Mark II glaze wine, and IPS e.max CAD LT polish wine were seen in decreasing order (Table 2). The data was evaluated using O'Brien clinical color tolerance scales (Table 3).

Table 1-c. Comparison of clinical color matching tolerance values of ΔE-3 categories based on groups

Experiment Layout			ΔE-3 Categories								Test Statistics **	
Material	Surface Finishing	Aging Method	Excellent		Good		Acceptable		Incompatible			
			n	%	*n*	%	*n*	%	*n*	%	x^2	*p*
E. MAX CAD LT	Glaze	Wine	0	0.0	0^a	0.0	2	20.0	8^{ab}	80.0	55.167	<0.001
		Coffee	0	0.0	6^b	60.0	2	20.0	2^b	20.0		
	Polish	Wine	0	0.0	0^a	0.0	0	0.0	10^a	100.0		
		Coffee	1	10.0	4^b	40.0	1	10.0	4^{ab}	40.0		
VITA MARK II	Glaze	Wine	0	0.0	0^a	0.0	0	0.0	10^a	100.0		
		Coffee	0	0.0	0^a	0.0	2	20.0	8^{ab}	80.0		
	Polish	Wine	0	0.0	0^a	0.0	0	0.0	10^a	100.0		
		Coffee	0	0.0	0^a	0.0	0	0.0	10^a	100.0		

a and *b* superscripts show the difference between groups in each category.

Table 2. Comparison of ΔE values

Experiment Layout			Measured Values			Test Statistics**	
Material	Surface Finishing	Aging Method	ΔE-1	ΔE-2	ΔE-3		
			$\bar{x}$±ss	$\bar{x}$±ss	$\bar{x}$±ss	*F*	*p*
E. MAX CAD LT	Glaze	Wine	1.07 ± 0.35^{aX}	1.83 ± 1.35^{aX}	6.40 ± 2.58^{abY}	5.671	0.005
		Coffee	1.62 ± 0.51^{a}	2.33 ± 0.94^{ab}	2.28 ± 1.61^{a}	1.819	0.170
	Polish	Wine	1.26 ± 0.42^{aX}	2.03 ± 0.84^{abX}	14.01 ± 4.00^{cY}	28.933	<0.001
		Coffee	1.99 ± 0.81^{ab}	2.57 ± 1.01^{abc}	3.39 ± 2.99^{ab}	1.273	0.286
VITA MARK II	Glaze	Wine	2.16 ± 1.47^{abX}	3.03 ± 1.21^{abcX}	17.20 ± 6.02^{cY}	40.304	<0.001
		Coffee	3.06 ± 1.59^{bc}	3.65 ± 1.72^{c}	5.33 ± 2.05^{ab}	1.656	0.198
	Polish	Wine	1.96 ± 1.28^{abX}	3.20 ± 1.17^{bcY}	36.38 ± 11.73^{dZ}	214.872	<0.001
		Coffee	3.28 ± 1.95^{cX}	3.72 ± 1.62^{cX}	7.79 ± 2.80^{bY}	3.687	0.030
Test Statistics*			*F*=4.381; *p*<0.001	*F*=3.206; *p*=0.005	*F*=46.037; *p*<0.001		

Model Statistics

Measurement: *F*=130.134; ***p*<0.001**
Material * Measurement: *F*=31.018; *p*<0.001
Surface Finishing * Measurement: *F*=21.408; *p*<0.001
Aging Method * Measurement: *F*=79.751; *p*<0.001
Material * Surface Finishing * Measurement: *F*=4.171; *p*=0.019
Material * Aging Method * Measurement: *F*=16.237; *p*<0.001
Surface Finishing * Aging Method * Measurement: *F*=13.021; *p*<0.001
Surface Finishing * Aging Method * Measurement: *F*=2.474; *p*<0.001

*Comparison of differences between groups in each measurement: The superscripts a, b, c, and d indicate groups that are different in each measurement.

**Comparison of each group between measurements: X, Y, and Z superscripts indicate the measurements that are different within the group.

Table 3. O'Brien clinical color matching tolerance values' test and color changes

ΔE	Clinical Color Match
0 - 0.5	Perfect
0.5 - 1	Excellent
1 - 2	Good
2 - 3.5	Acceptable
>3.5	Incompatible

No group has shown a perfect (ΔE=0-0.5) color match after four weeks of accelerated aging. Every group has shown results of significant statistical changes at various rates and percentages. In the excellent category (ΔE=0.5-1), only IPS e.max CAD LT polished- coffee samples were represented at 10%. In the good category (ΔE=1-2), IPS e.max CAD LT glazed and polished- coffee groups had the highest consistency rates with 60% and 40%, respectively, significantly different from other groups. In the clinically acceptable category (ΔE=2-3.5), IPS e.max CAD LT glazed groups, and VITA Mark II glazed-coffee groups were represented with 20%. In the incompatible category (ΔE > 3.5), IPS e.max CAD LT polished- wine, VITA Mark II glazed and polished-wine, and VITA Mark II polished- coffee samples were located with a 100% rate, as every example had undergone a color change that is unacceptable by clinical standards. They are followed by IPS e.max CAD LT glazed- wine, VITA Mark II glazed- coffee groups with 80%. After four weeks, the lowest rate noted in samples that showed inconsistency in sample data was the IPS e.max CAD LT glazed coffee group, with a 20% rate.

Discussion

Ceramics systems and CAD-CAM technologies that have developed in recent years allow for more complex restorations, and the usage of complete ceramics in different indications has increased (11).

Ivoclar Vivadent has presented IPS e.max CAD LT, which hopes to combine the IPS e.max CAD's material strength with aesthetic advantages. LT (low translucency) blocks are ideal for larger restorations in their transparency, similar to natural dentine (12). For this reason, we have chosen IPS e.max CAD LT as one possible block for testing. The other material we had chosen was VITA Mark II (VITA® Zahnfabrik) blocks, which have a feldspathic structure and contain 20-30% aluminum oxide in their composition (13).

After the laboratory procedures are finished, dental porcelains are treated with glazing to smooth out their surfaces (14). For a glazed restoration, contour correction, occlusal early contact control, or minimal changes done for esthetical improvements that happen before the cementation process can be carried out by polishing instead of repeating the glazing process over and over again. In the study of Jagger and Harrison (1994), it is pointed out that the glaze layer disappears after a while, and the revealed surface under it hurts the antagonist teeth as much as it would damage an unglazed tooth; however, the surfaces polished with Soflex disks and rubbers cause this less. In clinical practice, they point out that after the adjustments are done, the restoration surfaces must be polished (15). There are many different polishing kits with properties varying according to the type of ceramic used on the market. These sets contain burs, dental stones, rubber discs, discs and strips, pumice, and paste with different degrees of abrasiveness (16).

Aging procedures performed in vitro environments cannot fully replicate clinical conditions and the human mouth. Applied stress could be different from a mouth environment. Despite these, the aging procedures applied in a laboratory are essential to standardize the studies to understand the dental materials used (17). Ceramic systems have given independent values in different aging tests but overall similar ΔE change values (18).

CIELAB is the most common color representation space in dentistry, and as a result, its classic color-difference formula is mostly used in studies. The CIELAB color system has been extensively used in dental research and application. It has been employed in various studies, including measuring the color stability of ceramic crowns in vivo (19), examining developmental defects of enamel (20), determining tooth color prevalence (21), conducting dental whitening studies (22, 23), investigating the effect of thickness of monolithic zirconia on final color (24), predicting color change in tooth bleaching using fuzzy logic for Vita Classical shades (25), assessing the impact of aging and staining on the color of acrylic resin denture teeth (26), serving as a translucency parameter (27-30), and evaluating the color of silorane-based resin composite (27). That is why we used the CIELAB color formula in this study.

In color detection-oriented studies, measurement based on color scales cannot be concrete; therefore, devices such as colorimeters, spectrophotometers, and similar devices were used (31). Barizon et al. (2014) have said that ΔE values differ between ceramic types and thickness (32). O'Brien (2008), in their study, said that ΔE values higher than 3.5 cannot be considered clinically acceptable. The $\Delta E=[(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]^{1/2}$ formula utilized in our study was first used by Clarke in 1983. ΔE values, according to CIE L* a* b* system, give a numerical value as the distance between two points on a line. Accordingly, this value aims to be close to the minimum to achieve a clinically acceptable color match (33).

In the groups formed as a result of our study analysis, factors such as ceramic type, surface finishing process, and aging methods have resulted in statistically significant differences. According to our findings, two different whole ceramic sample groups presented at the beginning of our study were applied two different surface finishing procedures and exposed to two different accelerated aging processes, which were later measured by following O'Brien (16). Clinical Color Matching Tolerance Values' test and color changes (Table 3) higher than ΔE=3.5 (clinically identifiable) would show a higher color change rate with a different ΔE value in different types of ceramic samples would remain above the clinically identifiable level was accepted in this study as 100% rate in 4 out of 8 groups. Only the IPS e.max CAD LT glazed coffee group showed the highest frequency in the excellent category with 60%, and IPS e.max CAD LT polish coffee with 40%.

Like our in-vitro experiment environment, some limitations must be taken into consideration. Two different ceramic materials were treated for aging after two different surface finishing procedures with two different liquids. The accelerated aging procedure in our study does not completely represent a clinical environment. It is difficult to objectively evaluate the long-term color changes that happen to ceramics used in dentistry. To validate studies that might consider all variables and their data, in vivo studies must be carried out to support them.

Conclusion

The results obtained from our study, in which we examined the effect of the accelerated aging method in 2 different coloring solutions on the colors of lithium disilicate and feldspathic glass ceramics, which both had polishing and glazing procedures, can be summarized as:

1. VITA Mark II samples with feldspathic content, which sees limited use due to their weaker structure, have shown a deeper color change compared to lithium disilicate IPS e.max CAD LT samples after all the procedures were applied.
2. After polishing procedures, a rougher surface that can absorb more colorant and less reflective was formed, so more color changes were observed in these groups compared to samples that have been glazed.
3. C values that were taken as reference because their decrease happened inversely with pigment density increase show that ΔE value changes in wine groups were much more common than coffee groups.
4. a* value has increased substantially more in the VITA Mark II polish wine group compared to other groups' increases, and as a result, all groups have ended up with a red tint.
5. H values have decreased in all groups except for VITA Mark II glaze coffee group, and groups' color changes have changed from A2 to A3, C, and D.
6. In measurements of different timeframes, the ΔE values at the end of month one, which had the longest exposure time to coloring liquids, were higher than the other measurement times, suggesting that the coloration will continue to increase as the exposure time longer.
7. Since aging methods affect ceramic systems' ΔE values on different levels and surfaces, in vitro aging techniques are used for comparing color changes, the applied aging procedure protocol should be evaluated with ceramic types and surface finishing procedures.

Disclosures

Peer-review: Externally peer-reviewed.

Author Contributions: Conception – Ö.D.G.; Design – Ö.D.G., S.A.; Supervision – S.A.; Materials – Ö.D.G., S.A.; Data Collection and/or Processing – Ö.D.G., S.A.; Analysis and/or Interpretation – Ö.D.G.; Literature Review – Ö.D.G.; Writer – Ö.D.G.; Critical Review – S.A.

Conflict of Interest: No conflict of interest was declared by the authors.

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