IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 9 Ver. 8 (September. 2018), PP 77-82
www.iosrjournals.org

Effect of one-step polishing systems and bleaching on color of resin composites after staining

Fouad Salama BDS, MS[1],Mosleh Alshamrani, BDS, MDS, SBPD[2], Hamed Alshamrani, BDS, SBPD[3]

[1]*Department of Pediatric Dentistry and Orthodontics, College of Dentistry, King Saud University, Riyadh, Kingdom of Saudi Arabia*
[2]*Consultant in Pediatric Dentistry, Department of Pediatric Dentistry and Orthodontics, College of Dentistry, King Saud University, Riyadh, Kingdom of Saudi Arabia*
[3]*Consultant in Pediatric Dentistry, Department of Pediatric Dentistry and Orthodontics, College of Dentistry, King Saud University, Riyadh, Kingdom of Saudi Arabia*
Corresponding Author: Fouad Salama BDS, MS[1]

Abstract: ***Purpose:****The aims of this study were to evaluate the effects of OneGloss and PoGo one-step polishing systems and an office-bleaching agent (Ultradent Opalescence Boost PF 40%) oncolor of two nanocomposite resin restorative materials (Clearfil Majesty Esthetic and Filtek Z350 XTafter exposure to a staining solution.*
Methods:*Forty-five cylindrical specimens (8 mm diameter, 2 mm thickness) were prepared from each resin composite according to the manufacturer's instructions. Specimens were finished using a tungsten carbide finishing bur andthen thermocycled. The specimens prepared from each material were randomly allocated to three subgroups with 15 specimens in each restorative material. All specimens were measured for color (T1) using spectrophotometer Color-Eye 7000A. All specimens were immersed in staining coffee solution for 4 days and then measured for color (T2).Each group was subjected to different surface treatment, which included OneGloss or PoGo polishing systems for 30 seconds or bleaching using Ultradent Opalescence Boost PF 40% for 40 minutes. All specimens were measured for color (T3).*
Results:*No statistically significant color difference was observed between Clearfil Majesty Esthetic and Filtek Z350 XT at the testing phase one (T1) after finishing/thermocycling. Comparing the ΔE value of each resin composite at testing phases T2 and T3 showed significant change in color between pre- and post-staining steps as well as post-staining steps and polishing/bleaching step. Horizontal comparison between both resin composites for ΔE value between testing phases T2 and T3 showed a statistically significant change with Clearfil Majesty Esthetic having the largest color change after staining for all test subgroups.*
Conclusions:*Filtek Z350 XT nanofilled resin is more color stable than Clearfil Majesty Esthetic nanofilled resin. PoGo one-step polishing system resulted in more color change after staining than OneGloss one-step polishing system. Color change for Filtek Z350 XT, after polishing with PoGo or bleaching with Ultradent Opalescence Boost PF 40%, removed coffee staining to less than pre-stained values.*

Keywords: *Finishing/polishing, color, resin composite, in vitro, esthetics*

Date of Submission: 06-09-2018 Date of acceptance: 21-09-2018

I. Introduction

Various resin-composites restorative materials are available for direct restoration of adult and children teeth.[1] The surface properties of restorative materials play important role in the clinical success.[2] Some studies revealed that surfaces of restoration maybe affected by finishing and polishing.[3,4]Finishing is performed to create an anatomical shape and remove excess restorative material while polishing is performed to increase the shine of restoration and yield a natural look resembling enamel.[3,4]Most recent restorative materials have been introduced to the dental profession to meet demands for better esthetics.[5] The physical properties of different restorative materials such as color are influenced by exposure to the oral environment.[2]

Color matching and long-lasting color stability of the material are two major factors that influence the failure or success of an esthetic restoration.[5]The foundation of esthetically pleasing smileconcept is the unrecognizable esthetically pleasing dental restoration. Today's resin composites provide the dental practitioner a number of choices for a restorative method and material, and offer more control over the final result than in the past.[6,7]Resin composites are increasingly used for direct restoration of teeth due to their favorable physical, optimal esthetics, and mechanical properties, as well as availability of efficient bonding systems.[6,7]Nanotechnology is known as the production and manipulation of materials and structures in the range of about 0.1-100 nm by various physical and chemical methods.[8,9]One of the latest resin composite technology

is the nanofilled composite, which features a large amount of very small filler than the traditional microfilled composites and is designed to provide good mechanical properties, high translucency, high polish, and maximum esthetics,[9,10] allowing it to be used as both posterior and anterior restorations, thus replacing the microhybrid and microfill resin composites.

For resin composites different finishing and polishing procedures are routinely employed such as diamond points, carbide burs, abrasive disks, polishing pastes, as well as one-step polishing systems such as PoGo and OneGloss by which contouring, finishing, and polishing can be completed using a single instrument in minimal time.[4,11,12]PoGo is a one-step diamond micropolisher and OneGloss is an aluminum oxide finisher and polisher, which provide ideal finish for all types of resin composites and cemented restorations.[4,12]Generally, resin composites with smaller size filler particles provides better surface finish than one containing larger filler particles.[14] Highlypolished surfaces can be achieved by reducing inorganic particle size.[14]One-step polishing systems such as PoGo (DENTSPLY/Caulk, Milford, DE, USA) and OneGloss (Shofu INC, Japan) were introduced tocomplete contouring, finishing, and polishing using a single instrument in minimal time.[1,12]To our knowledge, limited studies have evaluatedthecolor of stained nanocomposite resin restorative materials after using different polishing or bleaching systems. Therefore, the aim of the present *in vitro* study was to evaluate the effects of two one-step polishing systems (PoGo and OneGloss)and one office-bleaching agent (Ultradent Opalescence Boost PF 40%) on color of two nanocomposite resin restorative materials (Clearfil Majesty Esthetic and Filtek Z350 XT) after exposure to a staining solution. The null hypothesis tested stated that there is no difference in the color among the stained resin composites after different using different polishingor bleaching systems.

II. Materials and methods

The Ethical Committee, College of Dentistry Research Center, King Saud University, approved this investigation. In this *in vitro* study, 45 cylindrical specimens (8 mm diameter, 2 mm thickness) were prepared from each nanocomposite resin(shade A3):Clearfil Majesty Esthetic (Kuraray Medical Co, Tokyo, Japan) [G1] and Filtek Z350 XT (3M ESPE, St. Paul, USA)[G2] according to the instructions of the manufacturers using cylindrical metal molds. Each material was placed into the cylindrical metal molds and covered with a Mylar matrix strip (Mylar Uni-Strip, L.D., Caulk Co., Milford, DE, USA)and pressed using glass slide (Shandon Polysine Slides, Thermo Scientific, Kalamazoo, MI, USA) in order to flatten the surface. The specimens were polymerized according to the instructions of the manufacturers using a LED curing light (Elipar S10, 3M ESPE, Seefeld, Germany) on each side.The bottom surface of each specimens was marked to avoid it is exposure to the applied tested instruments and materials. Each specimen was finished using a tungsten carbide finishing bur # 7206 (SS White Burs Inc., Lakewood, New Jersey, USA) for 15 seconds in a rotary motion to simulate initial finishing of the restorative material.A single investigator finished all specimens. One tungsten carbide finishing bur was used for each specimen. Specimens were stored in distilled water for 72 hours at room temperature (25°C). Specimens were thermocycled 1500 times cycles (SD Mechatronik GmbH Dental Research Equipment, W. Germany) in baths at 5^{o}C and 55^{o}C, with 5 seconds transfer time and 30 seconds dwell times. The specimens prepared from each material were randomly allocated to three subgroups (G1a, G1b, and G1c for Clearfil Majesty Esthetic)and (G2a, G2b, and G2c for Filtek Z350 XT) with 15 specimens in eachgroup. All specimens after "Finishing/Thermocycling Step"were measured for color (Testing Phase One - T1)using spectrophotometer Color-Eye 7000A (Gretag Macbeth, New Windsor, NY, USA).The power sample size was 0.81 and level of significant σ =0.05 with estimated standard deviation = 0.9, the sample size should be at least 9 in each group.

All specimens were immersed in staining coffee solution for 4 days and kept in an incubator. The coffee solution was prepared using 11 g powder (NESCAFE Classic Nestlé Brazil, Araras, Brazil) to 500 mL water. The solution was changed after 2 days. The initial pH value of the solution was measured using 3540 conductivity/pH meter (JENWAY-Barloworld Scientific, CM6 3LB, Essex, England) and recorded as 4.943, and the second pH value of the solution was recorded as 4.993. The disks were placed in a container with testing side facing up exposed to the staining solution. Then the specimens were cleaned ultrasonically (Eurosonic energy; Euronda SpA, Vicenza, Italy) in distilled water for 30 min and dried with air spray before testing according to modification of the methods described by Um and Ruyter (1991). All specimens after "Staining Step" were measured for color(Testing Phase Two – T2). Specimens were stored in distilled water for 24 hours at room temperature (25°C).Each group was subjected to different surface treatment of the entire surface. Surface treatments includedOneGloss (Shofu INC, Japan) or PoGo (DENTSPLY/Caulk, Milford, DE, USA) polishing system for 30 seconds (A new polishing disc was used for each specimen surface treatment) or the surface was bleached using Ultradent Opalescence Boost PF 40% (Ultradent Opalescence Boost PF 40%)for 40 minutes. The same investigator who finished the specimens; polished and bleached all specimens in each group. All specimens after "Polishing/Bleaching Step" were measured for color(Testing Phase Three – T3).

Statistical Analysis–The average deviations of color were calculated and results were analyzed using one-way and two-way repeated measures analysis of variance (ANOVA) and Fisher's least significant difference

(LSD) test. Correlations between staining and staining improvements as related to color was evaluated. All statistical analyses were set at a significance level of $p<0.05$. The statistical analysis was performed with SPSS Version 20.0 (SPSS Inc. Released 2007. SPSS for Windows, Chicago, SPSS Inc., Ill).

III. Results

When comparing Clearfil Majesty Esthetic and Filtek Z350 XT at the testing phase one (T1) after finishing/thermocycling step, no statistically significant color difference was observed (Table 1).

The pattern of total color change ΔE is shown in Tables 2 and 3. Comparing the ΔE value of each resin composite at testing phases T2 and T3 showed significant change in color between pre- and post-staining steps as well as post-staining steps and polishing/bleaching step. Table 2 shows vertical comparison between the resin composites for ΔE value between testing phases T2 and T3. There was a statistically significant change in color for Clearfil Majesty Estheticand Filtek Z350 XT from testing phase two,staining and testing phase three,polishing/bleaching, with either of the one-step polishing systems (OneGloss or PoGo) or bleaching with Ultradent Opalescence Boost PF 40%. However, the Clearfil Majesty Esthetic resin showing the largest change in ΔE.

Table 3 shows horizontal comparison between the resin composites for ΔE value between testing phases T2 and T3. A statistically significant change in the resin composites color with Clearfil Majesty Esthetic having the largest color change after staining for all test subgroups. In addition, a statistically significant difference in ΔE was evident for all test subgroups after polishing/bleaching for both restorative materials.

IV. Discussion

The tested null hypothesis in this investigation was rejected, as there wasdifference in the color among the stained resin composites after using different polishing or bleaching systems. In the present *in vitro* study, the color was analyzed because it has been demonstrated that physical properties of different restorative materials such as color is influenced by exposure to the oral environment.[2]One of the clinical significance of the color property is enhancing the esthetic features of the restorations. Color matching and long-lasting color stability can influence the failure or success of an esthetic restoration, as they should duplicate the natural tooth in color.[5,15]In this investigation, Spectrophotometer was used, as it is appropriate for measurement of the color of restorative materials.[16,17]Difference in color of tested restorative materials in this study after staining and polishing or bleaching may be due to their surface color which is influenced by surface morphology and roughness, pH value and type of anticaries agents, type of restorative material, type of storage media, and duration of storage.[18,19] In addition, because of the differences in methodologies, assessment time points, type of storage media and the understudy materials, it is difficult to compare the present observations to those of previous studies.

It has been reported a detrimental effect on the physical properties of resin-based restorative materials as a consequence of water sorption,[20] as water erodes the surface and causes hydrolysis and dissolution of some of their components.[21,22] On the other hand, it has been suggested that the oral environment is likely to cause more marked filler degradation than indicated by storage in distilled water.[22]Therefore, the changes which was observed occurring in distilled water do not necessarily take place to the same extent in the mouth.[23]

It was reported that ΔE value equal to 1 is considered to be detectable to 50% of observers under controlled conditions.[24]A ΔE value of less than or equal to 2 is often a clinically acceptable match.[25] A ΔE value equal to or greater than 3.7 is considered a clinical poor match that would require replacement of the restoration.[26]

In the present study, when comparing the ΔE values for each of the nanofilled resins after finishing/thermocycling step, there was no color change for either of the two resin composite materials. In addition, there was a statistically significant change in color for Clearfil Majesty Esthetic and Filtek Z350 XT from testing phase two, staining and testing phase three, polishing/bleaching, with either of the one-step polishing systems (OneGloss or PoGo) or bleaching with Ultradent Opalescence Boost PF 40%.

The greatest color differences in this study were seen after staining with coffee, which indicated a statistically significant difference of ΔE values for both resin composites. Similarly, it has been reported that nanofilled resin composites produce a larger color change when stained with coffee than other types of resins.[27] Although, only nanocomposite resins and no other type/system of resin composite was used in this study, this data supports the same concept that the staining of nanofilled resin composites results in large color changes. The color changes in the present study resulted in statistical significance differences when comparisons were made between the two nanofilled resins after being stained with coffee with the Clearfil Majesty Esthetic resin showing the largest change in ΔE. In addition, there was a statistically significant change in color for Clearfil Majesty Esthetic and Filtek Z350 XT from testing phase two, staining and testing phase three, polishing/bleaching, with either of the one-step polishing systems (OneGloss or PoGo) or bleaching with Ultradent Opalescence Boost PF 40%. However, the Clearfil Majesty Esthetic resin showed the largest change

in ΔE.The Filtek Z350 XT resin afterPoGo polishing system and bleaching as well as for Clearfil Majesty Esthetic after bleaching had low ΔE values (less than 1). This similar to another study that found coffee had a significant influence on discoloration of resin composite materials and that different composites behave differently in coffee solution.[28] The results are also consistent with another study, which reported that repolishing was effective in partially removing stain from resin composites.[29] Little is known about the effects of bleaching techniques on restorative materials.[30,31] This is similar to other studies that used 30% hydrogen peroxide for one week resulting in composite color changes which were presumably clinically detectable, but contradict other studies that showed no change in color was seen with a 10% solution of carbamide peroxide with water as a control.[32,33] This may be explained by the facts that different bleaching agents were used in the other studies and different amounts of time exposed to bleaching agents where used in other studies.In the present study,all subgroups of Filtek Z350 XT and Clearfil Majesty Esthetic following staining and polishing with PoGo or bleaching showed significant reduction in the ΔE value well below ΔE of 3.7 for clinical acceptance. While OneGloss showed ΔE value above ΔE of 3.7.

The results of this investigation should consider the limitations of the study, including it is *in vitro* setting. *In vitro* studies lack reproduction of oral environment, such as saliva, oral mastication and antagonist occlusion, and other factors, which affect the surface of the restorative materials. In addition, the clinical condition in the mouth is not easy to mimic in the laboratory setting.[34] Nevertheless, *in vitro* studies can provide isolated data of some variables with no interference from other factors. Thermocycling was performed in this study to simulate some aspects of the oral environment. Another limitation of this study was the use of two resin-composites only. It would be beneficial if more and different restorative materials/systems are tested. In addition, restorative material surface was flat which do not mimic clinical situation. However, despite these limitations, the research does describe a number of positive links between *in vitro* effect and clinical effect.

V. Conclusions

Under the experimental conditions and the methodology of this *in vitro* study, the following conclusions can be made:

1) Filtek Z350 XT nanofilled resin is more color stable than Clearfil Majesty Esthetic nanofilled resin.
2) PoGo one-step polishing system resulted in more color change after staining than OneGloss one-step polishing system.
3) Color change for Clearfil Majesty Esthetic, after polishing with both polishing systems or bleaching, partially removed coffee staining. However, not to values similar to pre-stained values.
4) Color change for Filtek Z350 XT, after polishing with PoGo or bleaching with Ultradent Opalescence Boost PF 40%, removed coffee staining to less than pre-stained values.
5) The potential reduction of color stability of tested restorative materials might be polishing systems and bleaching dependent.

Acknowledgements

The authors wish to thank College of Dentistry Research Center and Deanship of Scientific Research at King Saud University, Saudi Arabia for funding this research project.

References

[1] Dhar V, Hsu KL, Coll JA, Ginsberg E, Ball BM, Chhibber S, Johnson M, Kim M, Modaresi N, Tinanoff N. Evidence-based Update of Pediatric Dental Restorative Procedures: Dental Materials. J Clin Pediatr Dent 2015; 39: 303-310.
[2] Cazzaniga G, Ottobelli M, Ionescu A, Garcia-Godoy F, Brambilla E. Surface properties of resin-based composite materials and biofilm formation: A review of the current literature. Am J Dent 2015; 28: 311-320.
[3] Hervás-García A, Martínez-Lozano MA, Cabanes-Vila J, Barjau-Escribano A, Fos-Galve P. Composite resins. A review of the materials and clinical indications. Med Oral Patol Oral Cir Bucal 2006;11:E215-20.
[4] Patel B, Chhabra N, Jain D. Effect of different polishing systems on the surface roughness of nano-hybrid composites.J Conserv Dent 2016; 19:37-40.
[5] Barakah HM, Taher NM. Effect of polishing systems on stain susceptibility and surface roughness of nanocomposite resin material. J Prosthet Dent2014; 112: 625-631.
[6] Lee I, Chang J, Ferracane J. Slumping resistance and viscoelasticity prior to setting of dental composites. Dent Mater 2008;24:1586-1593.
[7] Avsar A, Yuzbasioglu E, Sarac D. The effect of finishing and polishing techniques on the surface roughness and the color of nanocomposite resin restorative materials. Adv Clin Exp Med 2015; 24:881-890.
[8] Beun S, Glorieux T, Devaux J, Vreven J, Leloup G: Characterization of nanofilled compared to universal and microfilled composite. Dent Mater 2005; 23: 51-59.
[9] Beun S, Glorieux T, Devaux J, Vreven J, Leloup G. Characterization of nanofilled compared to universal and microfilled composites. Dent Mater 2007;23:51-59.
[10] Mitra SB, Wu D, Holmes BN. An application of nanotechnology in advanced dental materials. J Am Dent Assoc 2003;134:1382-1390.
[11] Uctasli MB, Arisu HD, Omurlu H, Eligüzeloğlu E, Ozcan S, Ergun G. The effect of different finishing and polishing systems on the surface roughness of different composite restorative materials. J Contemp Dent Pract 2007; 8:89-96.
[12] Ferracane JL. Resin composite--State of the art. Dent Mater 2011; 27:29-38.

[13] Um CM, Ruyter IE. Staining of resin-based veneering materials with coffee and tea. Quintessence Int 1991;22:377-386.
[14] Marghalani HY. Effect of filler particles on surface roughness of experimental composite series. J Appl Oral Sci 2010;18:59-67.
[15] Poggio C, Ceci M, Beltrami R, Mirando M, Wassim J, Colombo M. Color stability of esthetic restorative materials: a spectrophotometric analysis. Acta Biomater Odontol Scand 2016; 2: 95-101.
[16] Debner T, Warren DP, Powers JM. Effects of fluoride varnish on color of esthetic restorative material. J Esthet Dent2000; 12: 160-163.
[17] Lee YK, Yu B, Lim HN, Lim JI. Difference in the color stability of direct and indirect resin composites. J Appl Oral Sci2011; 19: 154-160.
[18] Sarkis E. Color change of some aesthetic dental materials: Effect of immersion solutions and finishing of their surfaces. Saudi Dent J2012; 24: 85-89.
[19] Wang EM, Thomas A, Welten MJ, Tan L, Varma S, Tan I, Huang B. Aesthetic changes of restorative materials related to application of topical fluorides. Jökull J2015; 65: 178-186.
[20] Sarrett DC, Ray S. The effect of water on polymer matrix and composite wear. Dent Mater 1994; 10: 5-10.
[21] Söderholm KJ, Mukherjee R, Longmate J. Filler leachability of composites stored in distilled water or artificial saliva. J Dent Res1996; 75: 1692-1699.
[22] Söderholm KJ, Zigan M, Ragan M, Fischlschweiger W, Bergman M. Hydrolytic degradation of dental composites. J Dent Res1984; 63: 1248-1254.
[23] Anstice HM, Nicholson JW. Studies on the structure of light-cured glass-ionomer cements. J Mater Sci Mater Med1992; 3: 447-451.
[24] Kuehni FG, Marcus RT. An experiment in visual scaling of small color differences. Color Res Appl 1979; 4: 83-91.
[25] O'Brien WJ, Groh CL, Boenke KM. A new, small-color-difference equation for dental shades.J Dent Res 1990;69:1762-1764.
[26] Johnston WM, Kao EC. Assessment of appearance match by visual observation and clinical colorimetry.J Dent Res 1989;68:819-822.
[27] Villalta P, Lu H, Okte Z, Garcia-Godoy F, Powers JM. Effects of staining and bleaching on color change of dental composite resins. J Prosthet Dent 2006; 95: 137-142.
[28] Lu H, Roeder LB, Lei L, Powers JM. Effect of surface roughness on stain resistance of dental resin composites.J Esthet Restor Dent 2005;17:102-108; discussion 109.
[29] Türkün LS, Türkün M. Effect of bleaching and repolishing procedures on coffee and tea stain removal from three anterior composite veneering materials. J Esthet Restor Dent 2004;16:290-301; discussion 301-2.
[30] Jung CB, Kim HI, Kim KH, Kwon YH. Influence of 30% hydrogen peroxide bleaching on compomers in their surface modifications and thermal expansion. Dent Mater J 2002; 21: 396-403.
[31] Attin T, Hannig C, Wiegand A, Attin R. Effect of bleaching on restorative materials and restorations - a systematic review. Dent Mater 2004; 20: 852–861.
[32] Monaghan P, Lim E, Lautenschlager E. Effects of home bleaching preparations on composite resin color. J Prosthet Dent 1992; 68: 575-578.
[33] Canay S, Cehreli MC. The effect of current bleaching agents on the color of light-polymerized composites in vitro. J Prosthet Dent 2003; 89: 474-478.
[34] Eliades T, Eliades G, Silikas N,Watts DC. In vitro degradation of polyurethane orthodontic elastomeric modules. J Oral Rehabil2005; 32: 72-77.

Table 1. Horizontal comparison between the two resins for ΔE value at testing phase 1 (T1) after "Finishing/Thermocycling Step"

Resin Composites (Groups)	Clearfil Majesty Esthetic (Group 1)*			Filtek Z350 XT (Group 2)*		
Subgroups	G1a OneGloss	G1b PoGo	G1c Bleached	G2a OneGloss	G2b PoGo	G2c Bleached
ΔE value	0.08^{A}	0.34^{A}	0.25^{A}	0.48^{A}	0.78^{A}	0.83^{A}

*Not significant at *p*-value≤0.05 - ΔE calculated values with similar superscript shows none significant differences

Table2.Vertical comparison between the two resin composites for ΔE value after staining and polishing/bleaching steps

Resin Composites (Groups)	Clearfil Majesty Esthetic (Group 1)*			Filtek Z350 XT (Group 2)*		
Subgroups	G1a OneGloss	G1b PoGo	G1c Bleached	G2a OneGloss	G2b PoGo	G2c Bleached
ΔE value after staining	10.90^{a}	10.51^{a}	9.50^{a}	6.62^{a}	6.42^{a}	6.43^{a}
ΔE value after polishing/bleaching	4.68^{A}	2.13^{A}	0.72^{A}	1.23^{A}	0.42^{A}	0.51^{A}

*Significant at *p*-value≤0.05 - ΔE calculated values with corresponding superscript shows significant differences

Table 3. Horizontal comparison between the two resin composites for ΔE value after staining and polishing/bleaching steps

Resin Composites (Groups)	Clearfil Majesty Esthetic (Group 1)*			Filtek Z350 XT (Group 2)*		
Subgroups	G1a OneGloss	G1b PoGo	G1c Bleached	G2a OneGloss	G2b PoGo	G2c Bleached
ΔE value after staining	10.90^{a}	10.51^{b}	9.50^{c}	6.62^{A}	6.42^{B}	6.43^{C}
ΔE value after polishing/bleaching	4.68^{d}	2.13^{e}	0.72^{f}	1.23^{D}	0.42^{E}	0.51^{F}

*Significant at p-value≤0.05 - ΔE calculated values with corresponding superscript shows significant differences

Fouad Salama BDS, MS[1]"Effect of one-step polishing systems and bleaching on color of resin composites after staining"IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 9, 2018, pp 77-82.