



## CASE REPORT

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## Understanding the interaction of resin composite with light for predictable aesthetic results in anterior teeth: A case report

Compreensão da interação das resinas compostas com a luz para resultados estéticos previsíveis em dentes anteriores: Relato de caso

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### ABSTRACT

This case report illustrates a conservative technique for reintervention on anterior composite restorations in a young patient with composite veneers. The treatment incorporated the use of photos and digital planning to establish a harmonious smile design. In order to conserve the dental tissues, existing resin composites restorations in maxillary anterior teeth were carefully removed to minimize enamel reduction, followed by a study of color and shade of teeth considering factors such as hue, chroma, luminosity, opacity, translucency and light effects. Eight direct veneers were built up with resin composite taking the optical properties of the material into account and their influence on the thickness of the layers that create specific light effects when superimposed on each other. To obtain excellent results with a predictable working protocol, nanohybrid composite systems facilitate good aesthetics, avoiding more invasive treatment in an economic manner.

### KEYWORDS

Dental aesthetic; Optical properties; Resin composite.

### RESUMO

O presente relato de caso ilustra uma técnica conservadora para a re-intervenção em restaurações diretas de resina composta em pacientes jovens. O tratamento consistiu em fotos e planejamento digital para obtenção de um desenho digital do sorriso individual e harmonioso. De acordo com os princípios de máxima conservação da estrutura dentária, as restaurações existentes nos dentes superiores anteriores foram criteriosamente removidas para minimizar a redução do esmalte, seguido do estudo de cor e sombra dos dentes considerando fatores como matiz, croma, valor, opacidade, translucidez e efeitos de luz. Oito facetas diretas foram realizadas em resina composta considerando as propriedades ópticas do material e a influência destas na espessura das camadas de resina para criar efeitos de luz singulares quando sobrepostas. Para a execução de uma odontologia estética e consciente, em associação a um protocolo de trabalho previsível, os sistemas de resinas compostas nanohíbridas possibilitam resultados estéticos satisfatórios, evitando tratamentos mais invasivos de maneira economicamente viável.

### PALAVRAS-CHAVE

Resina composta; Estética dental; Propriedades ópticas.

## INTRODUCTION

A conservative aesthetic approach to re-establish the beauty of the smile and the harmony of the face plays an important role in the dental treatments in current dentistry [1]. In this scenario, once direct veneer restorations are considered a minimally invasive approach, they are a good option to correct esthetic deficiencies such as shade or shape abnormalities, severe discoloration and replacement of incongruous extensive restorations [2,3].

On the other hand, it is well known that these restorations might fail at some point due to the adhesive failure by hydrolytic and enzymatic degradation, pigmentation of restorative materials or teeth, cohesive fracture, microleakage, marginal discoloration, unsatisfactory aesthetic or the sum of all these factors. Thus, regardless of whether restorations are made of resin composite or ceramic, the patients will need to replace them [4-9].

The optical properties, mechanical behavior and the adherence presented by resin composites to dental tissues allow conservative approaches with a wide range of indications and long-term permanence in the oral environment as well as promoting health, function, morphology stability and biocompatibility with the surrounding tooth tissues [3,7].

The aforementioned advantages are feasible due to the development of monomers with higher molecular weight, lower light-cure shrinkage and improved technology to make and introduce inorganic filler particles with lower size and specific morphologies [10,11]. However, once the teeth are rich in color and light effects, the appropriate use of resin composite colors for each region and a careful analysis of translucency, chroma and luminosity of the teeth and of the material are essential to obtain imperceptible restorations. Thus, the light refraction, reflection and propagation throughout the composite and enamel should be similar [12,13].

The addition of thin layers of resin composite on the tooth makes good aesthetic results possible, as well as controls polymerization shrinkage and facilitates

sculpture, obtaining the proper shape and restoration with a natural appearance [14-17]. The direct laminate veneers technique does require minimal tooth preparation, prosthetic and laboratory steps, and luting agents to fill the adhesive interface. Moreover, one of the advantages of a direct technique using resin composites is the reversibility of the treatment and the easiest repair compared to ceramic restorations [18].

Therefore, this case report presents a minimal intervention approach for reintervention on anterior composite restorations in a young patient describing a direct laminate veneer technique and discussing how to obtain imperceptible and aesthetic results.

## CASE REPORT

A 20-year-old female patient was referred for treatment at the Bauru School of Dentistry (University of São Paulo, Bauru, São Paulo, Brazil), wishing to improve the shape and color of her teeth. The patient's concern has been the wide, darkened and asymmetrical teeth creating a disharmonious smile. According to the patient's history, after the orthodontic treatment, the composite restorations were made and were about seven years old. After the clinical and radiographic examination, extensive direct restorations in the maxillary anterior teeth were observed with overlap in the cervical region and inappropriate axial inclination (Figures 1 and 2). In order to improve the treatment plan, the Digital Smile Design (DSD) tool was conducted and the golden ratio grids were used as references for wax-ups providing a silicone palatal guide (Figure 3).

The shade selection was performed on clear and hydrated teeth by incremental placement at different regions of the labial surface since this technique enables easier and straight-forward appreciation of color (Figures 4 and 5). To obtain a correct color and a reference to the stratification steps, dentin color of resin was selected after polymerization in the cervical third. The enamel color at the incisal third, taking into account the need to reproduce mamelons and opalescence

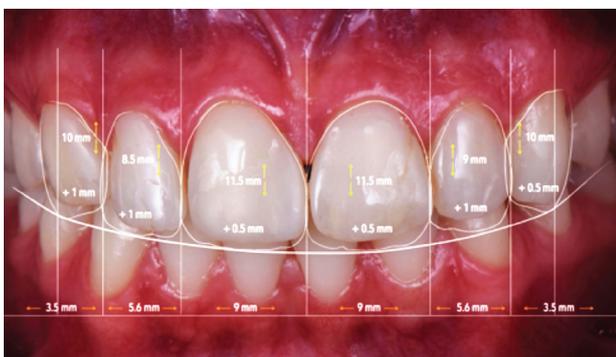
effect at the incisal edge amongst the precise demarcations of dentin extensions through the enamel. Additionally, grayscale and cross-polarized photographs were taken to evaluate the basic color (hue), saturation (chroma) and brightness (value) (Figure 5).



**Figure 1** - Preoperative frontal view of the smile.



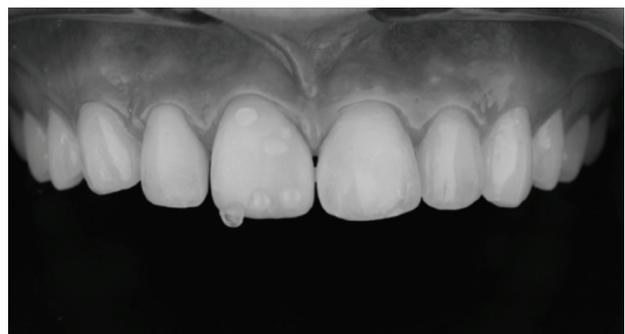
**Figure 2** - Incongruous restoration of 11, 12, 13, 21, 22, 23, with wrong shape, unnatural color and marginal over contours.



**Figure 3** - Photographs according to the DSD protocol were obtained as well as diagnosis cast. Keynote was used to produce a 2D smile design and obtain the calibrated measurements for a 3D smile design.



**Figure 4** - After radiographic evaluation, color was selected with a custom shade guide of enamel composite resin at the incisal third and dentin composite at the cervical third. A translucent composite was placed at the incisal edge and photoactivated.



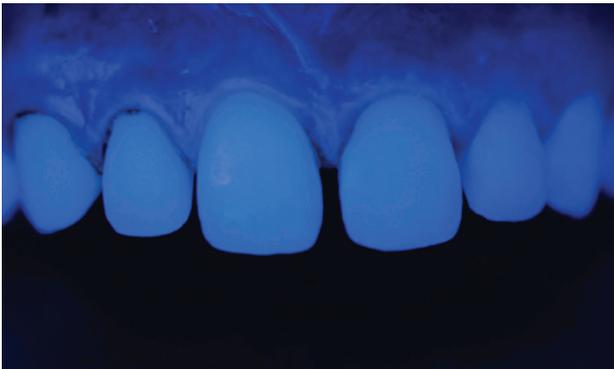
**Figure 5** - Grayscale photography used for evaluation of value of the enamel composite resins.

After preparation, the remaining teeth structures were adequate to receive direct composite laminate veneer restorations. To remove old restorations, a high-speed hand-piece under water cooling with the aid of fluorescent light was used to highlight the restorative material and minimize enamel reduction (Figures 6 and 7).

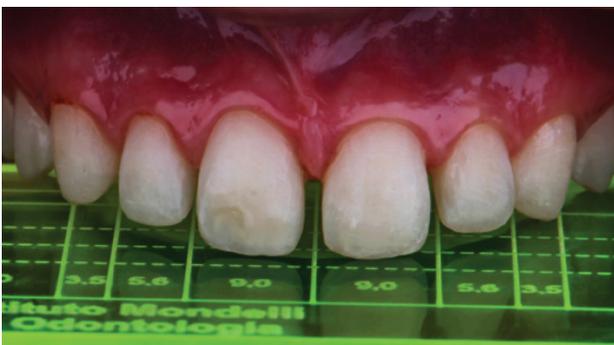
A rubber dam was placed and the silicon guide was positioned to check the adaptation and mark a line following the entire palatal margin with an exploratory instrument to minimize excess removal at the polishing steps. Teflon tape was placed in the proximal areas before the adhesive procedures. All surfaces were acid etched with 37% phosphoric acid (Ultra-etch, Ultradent, USA) for 30 s and slightly dried (Figures 8 and 9). A bonding agent of etch-and-rinse adhesive (Scotch Bond Multipurpose, 3M ESPE, USA) was applied and the excesses were removed. All surfaces were

photo activated for 20 s (Blue-LED >650mW/cm<sup>2</sup> D700; Dabi Atlante, São Paulo, Brazil).

In addition to the orthodontic ligatures inserted during field isolation procedures, a small amount of opaque resin composite was placed and polymerized onto the cervical area to retain the rubber dam. Then, a thin layer of high translucent resin composite (Trans 30, Empress Direct, Ivoclar Vivadent, Schaan, Liechtenstein) was applied on the silicone guide and put in position. This layer should be no more than 0.3 mm-thick, represented only by a scaffold for the body of the restoration in the shape of a half shell (Figure 10). During the palatal wall modeling, resin composite could adhere to the adjacent teeth, when this occurs, a metallic saw is used to separate the teeth without breaking the palatal wall.



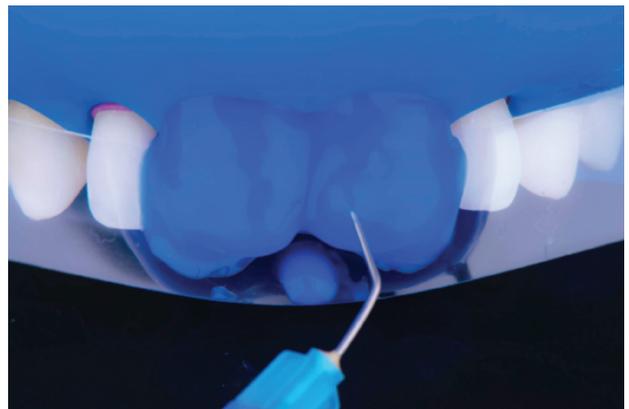
**Figure 6** - Fluorescent light to highlight the restorative material and minimize enamel reduction. The aspect must be smooth, clean and uniform.



**Figure 7** - To improve analysis and planning, golden ratio grids was used.



**Figure 8** - Measurements from the 2D smile design were transferred to the cast and a diagnostic wax-up was produced to make a silicon guide.



**Figure 9** - All surfaces were acid etched with 37% phosphoric acid (Ultra-etch, Ultradent, USA) for 30 s and slightly dried.



**Figure 10** - The palatal wall is built with a thin layer of enamel composite resin.

Throughout the technique, light-activation was performed after each layer of resin composite to promote an adequate degree of conversion of monomers and to allow the sequence of steps. The build up of the proximal wall should be made thin, anatomical and rounded by the interposition of a wedge and unilateral matrix (Unimatrix - TDV, Santa Catarina, Brazil), accommodating the chromatic enamel resin composite (A1 Enamel - Empress direct, 3M ESPE, Ivoclar Vivadent, Schaan, Liechtenstein) (Figure 11).

Afterward, the limits of the tooth were well defined, especially in the cervical area, without excess. Then, to replicate the opacity of natural dentin, a thin layer of high saturation resin composite (A2 Dentin – Empress direct, Ivoclar Vivadent, Schaan, Liechtenstein) was applied on the entire tooth surface. A second layer of resin composite was applied at three specific points to reproduce mamelons and intrinsic characteristics (A1 Dentin – Empress direct, Ivoclar Vivadent, Schaan, Liechtenstein) (Figure 12). A small and thin cylinder of opaque resin composite was placed incisally in order to mimic the halo effect.



**Figure 11** - Interposition of unilateral matrix to build up the proximal wall.



**Figure 12** - To form the opacious body, dentine mass was applied: a thin layer of high saturation composite resin and a second layer to reproduce mamelons and intrinsic characteristics.

Finally, the finish layer of chromatic enamel resin composite was applied to the entire outer surface in a single increment, accommodated until it was adapted to all limits of the labial and proximal surfaces with a flat spatula (Figure 13). Next, a marten's hair brush (1021 no 2, Hotspot Design - 1021, Curitiba, Paraná, Brazil) was used to increase surface smoothness to obtain the necessary microtexture and adequate modelling, significantly reducing the finishing step.

Throughout the procedures and at the end of the treatment, the profile of the restoration was verified at the incisal, proximal and twelve o'clock positions in order to maintain proper alignment due to lack or excess of material. The labial volumes of the teeth need to be checked in comparison to the other teeth.

In the first step of finishing, shape details were performed to ensure correct cervical adaptation and absence of over-contour with a surgical blade #12D (Lamedid, Barueri, SP, Brazil) by shaving the center of the tooth out. Afterwards, a red sandpaper disc (Sof-Lex, 3M ESPE, São Paulo, Brazil) was positioned parallel to the incisal edge of the two upper

central incisors and centralized at 90° with the median dental line to ensure the same length.

Using a pencil, the labial surfaces of the teeth were divided into three thirds, and the width was measured for each one using a caliper to verify the size and symmetry of the homologous teeth by the distance between the transition lines and reflection angles (Figures 14 and 15). The outline of the mesial and distal light reflection lines of the labial surfaces were demarcated and repositioned by wear of the proximal region. Then, the contour of the incisal and cervical embrasures were performed. The distal angle of the incisal embrasures was made more rounded than the mesial angle because it is adequate for the anatomical characteristics of the female smile. In the finishing procedures, only intermediate grain discs were used (dark orange and light orange Sof-Lex, 3M ESPE, São Paulo, Brazil). It is important to ensure symmetrical proportion and integration of the restoration with the other teeth, observing the angle lines which divide the plane area of the large reflection light and shadow area which lies outside the angle lines and is rounded.



**Figure 13** - Finish layer of chromatic enamel composite resin was applied to the entire outer surface.



**Figure 14** - The distance between the transition lines and reflection angles were delimited.



**Figure 15** - Macro and micro texture details.



**Figure 16** - The final result of restoration.



**Figure 17** - One-week follow-up showing the final result of the smile.

In addition, it is mandatory to reproduce the macro and micro texture details which must be compatible with the age of the patient and the adjacent teeth. Thus, two depressions and subtle cervical markings were made using a diamod bur (no 3113 F – KG Sorensen, São Paulo, SP, Brazil) in low speed without water to have better control. Interproximal polishing was done with strips of sandpaper (KG

Sorensen, São Paulo, SP, Brazil). At the end, to get an enamel-like brightness surface, small grain polishing paste (Enamelize - Cosmedent, Chicago, USA) and a felt disc (FGM, Joinville, Santa Catarina, Brazil) were used (Figure 16 and 17). Afterward, the occlusal contacts were evaluated to ensure balanced distribution of occlusal load and absence of interference.

## DISCUSSION

The present clinical case reports a conscious approach to a common paradox when solving the aesthetic needs of patients. Current concepts of conservatism in dentistry highlight that excellent clinicians have been recognized not only by the good aesthetic results they obtain, but by the awareness to avoid needless restorative treatments (e.g. avoiding aesthetic restorative treatments in young patients while achieving a balanced smile) and to recognize the appropriate times to replace restorations [4-6,8,19].

This concern has been shown in some studies which highlight that there are two major factors associated to failures in resin composite restorations: secondary caries and fracture, but the aesthetic demands seem to be the predominant reason for untimely reinterventions on anterior restorations [1,5]. Therefore, as suggested in the present case report, it is important to establish stringent criteria to indicate restorative treatments which only aim to improve the aesthetic smile, as well as to consider more conservative treatment techniques which allow to slow repetitive restorative cycles, easy reparability and individualization of smile designs [20-22].

To achieve the best outcomes, shade selection steps deserve attention in order to avoid unnecessary reinterventions. The optical phenomena occurring on natural teeth display the rich details in the dentin and enamel structures. The dentin offers the basic color of the teeth and enamel confers the value and modulates chroma varying the thickness [23,24]. Moreover, to reduce the subjective factors and influence of light source, the knowledge of the material's composition, reflection of light and the use of the Munsell's color parameters (i.e. three dimensions defined

by hue, chroma and value) are important [25]. On the other hand, according to the subtractive color system, adding several resin colors to the sum of many pigments results in a greyish or darkening restoration because it relies on the interaction of light reflected in a specific wave spectrum and the interaction with the decoded pigment [26-29].

A common mistake in the layering technique is to insert a thickness of respective resin to replace lost tissue because the light refraction and reflection indexes of composites and enamel are not equal. Whereas, the thickness of the dentin resin is increased, the hue and translucency decrease, but the chroma remains unchanged [13]. The first layer of dentin (0.5 mm) using more saturated chroma than the main one of the tooth is justified to give the eye's perception of the dentin depth before inserting the main dentin resin layer. When using the controlled body thickness technique, the translucency, hue, value and chroma are very accurate, obtaining unperceivable restorations [30,31].

Moreover, the way that the light passes through the enamel is very complex since it reflects and refracts a great deal, but usually in resin composites, the light travels less efficiently. Inside resin composites, light scattering is caused by refraction and reflection of light energy at the interface between the organic resin matrix and inorganic particles, varying according to size and type of particle (e.i. an inverse relationship: the smaller particles improve light scattering) [32,33].

The key factor relies on the enamel thickness of the resin composite to achieve an optical integration, making two completely different materials look the same. In general, when using 0.5 mm of enamel resin composite on the dentin layer, the enamel effect is almost imperceptible because it modifies the dentin without lowering value. At higher thicknesses such as 0.7 mm and 1.0 mm, the enamel resin composite on the labial and proximal surfaces hides the dentin resin composite layer and lowers the value, making the restoration greyish [3,14].

Additionally, it is also important to reproduce the shape parameters such as the

golden proportion, labial surface volume, length, width, contour, flat area, lobes (mesial, central and distal on flat area), crests, vertical grooves, texture, incisal edge thickness, palatine and cervical adaptation, contact points, and embrasures [3,34], once a wide variety of clinical problems are the result of poor finishes/polishing. Therefore, the esthetic considerations and the absence of gingival irritation, biofilm accumulation and caries infiltration are crucial reasons why the surface smoothness of the resin composite is desirable and requires periodic maintenance of the restorations [35,36].

As suggested in this case report, resin composite veneers present a range of advantages than indirect ceramic veneers when the aim is a high esthetic outcome, delaying a cascade of high costly restorative treatments, according to the principles of minimal intervention.

## CONCLUSIONS:

Regarding resin composite veneers, the possibility of predictable esthetic biomimetics outcomes (i.e. color, translucency, opacity, hue, value, etc.), excellent finishing and polishing, shape, biological integration and function (anterior and canine guidance, phonetics), new minimal interventional concepts should be followed when performing esthetic restorative treatments.

## REFERENCES

1. Solon Mello M, Milioni R, Santos GOD, Martins L, Monte Alto RV. Noninvasive approach to esthetic rehabilitation of conoid anterior teeth. *Gen Dent*. 2017 Sep-Oct;65(5):e12-e16.
2. Gouveia THN, Theobaldo JD, Vieira-Junior WF, Lima DANL, Aguiar FHB. Esthetic smile rehabilitation of anterior teeth by treatment with biomimetic restorative materials: a case report. *Clin Cosmet Investig Dent*. 2017 May 11;9:27-31. doi: 10.2147/CCIDE.S130698. eCollection 2017.
3. Bazos P, Magne P. Bio-emulation: biomimetically emulating nature utilizing a histo-anatomic approach; structural analysis. *Eur J Esthet Dent*. 2011 Spring;6(1):8-19.
4. Demarco FF, Collares K, Corra MB, Cenci MS, Moraes RR, Opdam NJM. Should my composite restorations last forever? Why are they failing? *Braz Oral Res*. 2017 Aug 28;31(suppl 1):e56. doi: 10.1590/1807-3107BOR-2017.vol31.0056.
5. Demarco FF, Collares K, Coelho-de-Souza FH, Correa MB, Cenci MS, Moraes RR et al. Anterior composite restorations: a systematic review of long-term survival and reasons for failure. *Dent Mater*. 2015 Oct;31(10):1214-24. doi: 10.1016/j.dental.2015.07.005. Epub 2015 Aug 21.
6. Ahmed KE, Murbay S. Survival rates of anterior composites in managing tooth wear: systematic review. *J Oral Rehabil*. 2016 Feb;43(2):145-53. doi: 10.1111/joor.12360. Epub 2015 Oct 5.
7. Wilson N, Lynch CD, Brunton PA, Hickel R, Meyer-Luechek H, Gurgan S, et al. Criteria for the replacement of restorations: Academy of Operative Dentistry European Section. *Oper Dent*. 2016 Sep;41(S7):S48-S57.
8. Heintze SD, Rousson V, Hickel R. Clinical effectiveness of direct anterior restorations: a meta-analysis. *Dent Mater*. 2015 May;31(5):481-95. doi: 10.1016/j.dental.2015.01.015. Epub 2015 Mar 13.
9. Laske M, Opdam NJ, Bronkhorst EM, Braspenning JC, Huysmans MC. Longevity of direct restorations in Dutch dental practice: descriptive study out of a practice based research network. *J Dent*. 2016 Mar;46:12-7. doi: 10.1016/j.jdent.2016.01.002. Epub 2016 Jan 11.
10. Da Rosa Rodolpho PA, Donassollo TA, Cenci MS, Loguercio AD, Moraes RR, Bronkhorst EM, et al. 22-year clinical evaluation of the performance of two posterior composites with different filler characteristics. *Dent Mater*. 2011 Oct;27(10):955-63. doi: 10.1016/j.dental.2011.06.001. Epub 2011 Jul 16.
11. Ferracane JL. Resin composite—state of the art. *Dent Mater*. 2011 Jan;27(1):29-38. doi: 10.1016/j.dental.2010.10.020. Epub 2010 Nov 18.
12. Coelho-de-Souza FH, Gonçalves DS, Sales MP, Erhardt MC, Corrêa MB, Opdam NJ, et al. Direct anterior composite veneers in vital and non-vital teeth: A retrospective clinical evaluation. *J Dent*. 2015 Nov;43(11):1330-6. doi: 10.1016/j.jdent.2015.08.011. Epub 2015 Aug 28.
13. Sproull RC. Color matching in dentistry. Part II. Practical applications of the organization of color. *J Prosthet Dent*. 2001 Nov;86(5):458-64.
14. Vanini L. Light and color in anterior composite restorations. *Pract Periodontics Aesthet Dent*. 1996 Sep;8(7):673-82; quiz 684.
15. Nahsan FP, Mondelli RFL, Franco EB, Naufel FS, Ueda JK, Schmitt VL, et al. Clinical strategies for esthetic excellence in anterior tooth restorations: understanding color and resin composite selection. *J Appl Oral Sci*. 2012 Mar-Apr;20(2):151-6.
16. Francisconi LF, Freitas MCCA, Oltramati-Navarro PV, Lopes LG, Francisconi PAS, Mondelli RFL. Multidisciplinary approach on the establishment and maintenance of an esthetic smile: a nine-year follow-up case report. *Quintessence Int*. 2012 Nov-Dec;43(10):853-8.
17. Ishikiriyama SK, Valeretto TM, Franco EB, Mondelli RFL. The influence of factor C and light activation technique on polymerization contraction forces of resin composite. *J Appl Oral Sci*. 2012 Nov-Dec;20(6):603-6.
18. Fahl N. A polychromatic composite layering approach for solving a complex class IV/direct veneer/ diastema combination: Part II. *Pract Proced Aesthet Dent*. 2007 Jan-Feb;19(1):17-22.
19. Collares K, Opdam NJM, Laske M, Bronkhorst EM, Demarco FF, Correa MB, et al. Longevity of anterior composite restorations in a general dental practice-based network. *J Dent Res*. 2017 Sep;96(10):1092-9. doi: 10.1177/0022034517717681. Epub 2017 Jun 30.
20. Elderton RJ. Clinical studies concerning re-restoration of teeth. *Adv Dent Res*. 1990 Jun;4:4-9.
21. Zero DT, Zandona AF, Vail MM, Spolnik KJ. Dental caries and pulp disease. *Dent Clin North Am*. 2011 Jan;55(1):29-46. doi: 10.1016/j.cden.2010.08.010.
22. D'Alpino PH, Svizero Nda R, Bim Júnior O, Valduga CJ, Graeff CF, Sauro S. Effects of age condition on the distribution and integrity of inorganic fillers in dental resin composites. *Clin Oral Investig*. 2016 Jun;20(5):1011-9. doi: 10.1007/s00784-015-1599-9. Epub 2015 Sep 21.
23. Duarte S Jr, Perdigão J, Lopes M. Resin composite restorations – Natural aesthetic and dynamics of light. *Pract Proced Aesthet Dent*. 2003

- Oct;15(9):657-64; quiz 666.
24. Pecho OE, Ghinea R, Do Amaral EA, Cardona JC, Della Bona A, Pérez MM. Relevant optical properties for direct restorative materials. *Dent Mater*. 2016 May;32(5):e105-12. doi: 10.1016/j.dental.2016.02.008. Epub 2016 Mar 16.
  25. Rauber GB, Bernardon JK, Vieira LCC, Baratieri LN. Evaluation of a technique for color correction in restoring anterior teeth. *J Esthet Restor Dent*. 2017 Sep;29(5):309-316. doi: 10.1111/jerd.12320. Epub 2017 Jul 22.
  26. Haddad HJ, Salameh Z, Sadig W, Aboushelib M, Jakstat HA. Allocation of color space for different age groups using three-dimensional shade guide systems. *Eur J Esthet Dent*. 2011 Spring;6(1):94-102.
  27. Joiner A. Tooth colour: A review of the literature. *J Dent*. 2004;32 Suppl 1:3-12.
  28. Hein S, Zangl M. The use of a standardized gray reference card in dental photography to correct the effects of five commonly used diffusers on the color of 40 extracted human teeth. *Int J Esthet Dent*. 2016 Summer;11(2):246-59.
  29. Schmeling M, Meyer-Filho A, de Andrada MA, Baratieri LN. Chromatic influence of value resin composites. *Oper Dent*. 2010 Jan-Feb;35(1):44-9. doi: 10.2341/09-44-L.
  30. Lee YK. Influence of scattering/absorption characteristics on the color of resin composites. *Dent Mater*. 2007 Jan;23(1):124-31. Epub 2006 Feb 17.
  31. Haenel T, Hausnerova B, Steinhaus J, Price RB, Sullivan B, Moeginger B. Effect of the irradiance distribution from light curing units on the local micro-hardness of the surface of dental resins. *Dent Mater*. 2015 Feb;31(2):93-104. doi: 10.1016/j.dental.2014.11.003. Epub 2014 Dec 5.
  32. Gurrea J, Gurrea M, Bruguera A, Sampaio CS, Janal M, Bonfante E, et al. Evaluation of dental shade guide variability using cross-polarized photography. *Int J Periodontics Restorative Dent*. 2016 Sep-Oct;36(5):e76-81. doi: 10.11607/prd.2700.
  33. Perez MM, Hita-Iglesias C, Ghinea R, Yebra A, Pecho OE, Ionescu AM, et al. Optical properties of supra-nano spherical filled resin composite compared to nanofilled nano-hybrid and micro-hybrid composites. *Dent Mater J*. 2016;35(3):353-9. doi: 10.4012/dmj.2015-126.
  34. Reis A, Higashi C, Loguercio AD. Re-anatomization of anterior eroded teeth by stratification with direct resin composite. *J Esthet Restor Dent*. 2009;21(5):304-16. doi: 10.1111/j.1708-8240.2009.00281.x.
  35. Moda MD, Godas AGL, Fernandes JC, Suzuki TYU, Guedes APA, Briso ALF, Bedran-Russo AK, Dos Santos PH. Comparison of different polishing methods on the surface roughness of microhybrid, microfill, and nanofill resin composites. *J Investig Clin Dent*. 2018 Feb;9(1). doi: 10.1111/jicd.12287. Epub 2017 Aug 1.
  36. Kaizer MR, de Oliveira-Ogliari A, Cenci MS, Opdam NJ, Moraes RR. Do nanofill or submicron composites show improved smoothness and gloss? A systematic review of in vitro studies. *Dent Mater*. 2014 Apr;30(4):e41-78. doi: 10.1016/j.dental.2014.01.001. Epub 2014 Feb 11.

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