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Direct restorative approach with composite resin in a discolored tooth: a case report

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Abstract

Aim: This case report aimed to discuss the clinical sequence and the indications of the direct veneer technique with composite resin to mask a discolored tooth. Case report: A 18-year-old male patient attended a Dental School for treatment of the maxillary central incisors. During the initial examination, the patient reported a dental traumatism in childhood fracturing both teeth. Tooth 21 had already been endodontically treated, and the patient complained of the darkened color, while tooth 11 had been fractured for a long time. Results: Poor class IV composite resin restoration was found, showing rests of endodontic material on tooth 21 and class IV dental fracture on element 11. The elements were cleaned, restorative materials were removed and composite resin veneers were made using a silicone guide technique. Finishing and polishing were performed in the next session, reproducing some of the peculiar characteristics of young teeth, consistent with the patient's age, such as macro and microtextures. Conclusion: The use of direct veneers in composite resin proved to be efficient to restore the aesthetics of darkened and fractured teeth, restoring aesthetic satisfaction through the transformation of the patient's smile.

KEYWORDS: Composite resins; Dental veneers; Tooth discoloration.

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Introduction

The appearance and valuation of concepts involving aesthetics and the search for "beautiful" are becoming more valued each day. This search is related to functional aesthetic procedures to establish favorable results that are within the beauty standards dictated by society[1]. The aesthetic valuation became more evident from the 90's, when the literature already mentioned that white, well contoured and well-aligned teeth establish the standard of beauty[2,3]. Aspects related to disharmony, changes in dental positions, color, shape, and size compromise facial harmony[2]. Therefore, advances have been made in the physical and optical properties of dental materials, providing the development of more conservative techniques and obtaining results that are increasing as aesthetically predictable. Those can reproduce the characteristics of the healthy dental structure as accurate as possible[3].

In clinical practice, a common complaint among patients is dissatisfaction with the appearance of anterior teeth. The causes associated are often multifactorial, which can be caused by caries, dental malformation, anatomical alteration, or discoloration. The evolution of adhesive systems and composite resins have improved the performance of these less invasive aesthetic procedures and has shown excellent results, allowing the reproduction of the optical properties inherent to natural teeth[4]. The composite veneers consist of the application and sculpture of one or more layers of this material on the dental surface. The performance of these restorations has become popular in recent years because of two main factors: the possibility of preserving a healthy dental structure and excellent aesthetic results. The rehabilitation technique using composite resin stands out for its practicality, safety, and efficiency. Besides, it does not require laboratory steps or dental provisionals[5].

Aesthetic veneers are restorations that cover the buccal surface of anterior teeth, occasionally proximal and incisal ones, aiming

to correct discrepancies in color, shape, texture, function, and dental positioning. When performed using the direct technique, an aesthetic result is obtained in a single session, in addition to having a good cost-benefit ratio[3,4].

Thus, this work aims to describe the operative steps for the confection of composite veneers in an academic clinical environment at a dental school in the north of the state of Minas Gerais, Brazil and to discuss the aspects related to the reported case.

Case report

A 18-year-old male patient attended the Dental Clinic of Faculdades Unidas do Norte de Minas - FUNORTE for treatment of the maxillary central incisors. During the initial examination, the patient reported a previous dental trauma occurred during his childhood, with the fracture of teeth 11 and 21 (Figure 1a). Tooth 21 had already been endodontically treated (Figure 1b) and the patient complained about the darkened color. Tooth 11 had been fractured for a long time, presenting a poor restoration. Also, the patient had a considerable loss of vestibular enamel due to erosion, which justified the reconstruction of class IV restorations and the indication of the veneer in composite resin with minimal preparation, since the tooth already had a loss of structure.

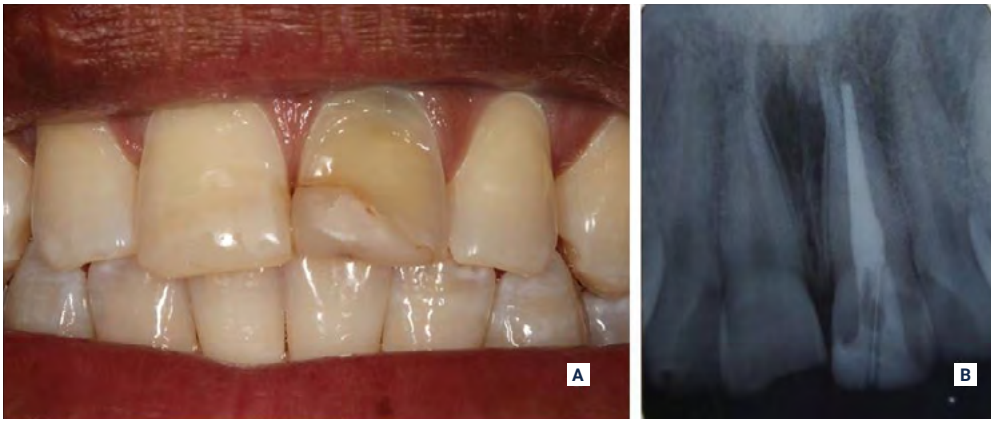

FIGURE 1 · (A) Traumatically involved teeth. **(B)** Pre-operative radiograph.

The manufacturing of veneers involving unsatisfactory class IV restorations was performed by the silicone wall technique. Thus, using a putty condensation silicone (Perfil™; Coltene, Rio de Janeiro, Brazil), the palatal face of the teeth that were properly shaped was molded (Figure 2b). Then, prophylaxis of the teeth was performed so that the color selection could be made. The trademarks and colors selected were: Brilliant Ever Glow™ OA3 resin (Coltene, Whaledent, Altstätten) for dentin and Filtek Z350™ A2E resin (3M ESPE) for enamel. Then, anesthesia, rubber dam isolation, removal of old restorative materials and orthodontic wire inside the tooth 21 channel were performed (Figure 2c and d). After the preparation, acid conditioning was performed with 37% phosphoric acid for 30 seconds in enamel and 15 seconds in dentin followed by washing for the same time of application and drying with a wet cotton ball. The adhesive system (single bond Universal™-3M ESPE) was applied with a microbrush according to manufacturer´s instructions followed by photoactivation (Radii-cal™; SDI, São Paulo, SP, Brazil) for 30 seconds (Figure 2e).

FIGURE 2 · Clinical sequence of procedures. **(A)** Initial situation. **(B)** A palatal impression of previous restorations. **(C)** Dental preparation. **(D)** Appearance after preparation, with the removal of orthodontic wire that functioned as a post. **(E)** Application of the adhesive system and photoactivation. **(F)** Insertion of composite resin in the silicone matrix. **(G)** Composite resin increment firstly inserted in the palatal face. **(H)** Surface resin composite increments simulating the enamel. **(I)** Anatomical characterization of Restoration (finishing and polishing phase). **(J)** Finished and polished veneers. **(K)** Immediate result (note the dehydration of the natural dental elements). **(L)** Aspect in the reevaluation, where a color harmony was observed with the neighboring teeth, but with a discolored cervical area that required reintervention.

The insertion of the restorative material started with the construction of the palatal wall (Figures 2f and g). Then, a layer of dentin resin was applied and finished with an increment of enamel resin covering the entire buccal surface (Figure 2h).

In another session, the stages of finishing and polishing the restorations were carried out, reproducing some of the peculiar characteristics of young teeth, consistent with the patient's age, such as macros and microtextures (Figure 2 i-l).

After the period of rehydration of the teeth, the patient was called again to be evaluated the cervical region, which had a very dark substrate, and primarily it was decided not to perform a more invasive preparation to preserve the dental structure.

However, in the reassessment, the need to repair the veneer of tooth 21 was identified for a better aesthetic effect. Thus, the preparation was only made in the cervical region (Figure 3a). Modified rubber dam isolation, insertion of teflon tape for gingival retraction, and adhesive procedures were performed as previously described. Then, a flowable composite WO (GrandioSO™ Flow-VOCO, Porto Alegre, RS, Brazil) was inserted to mask

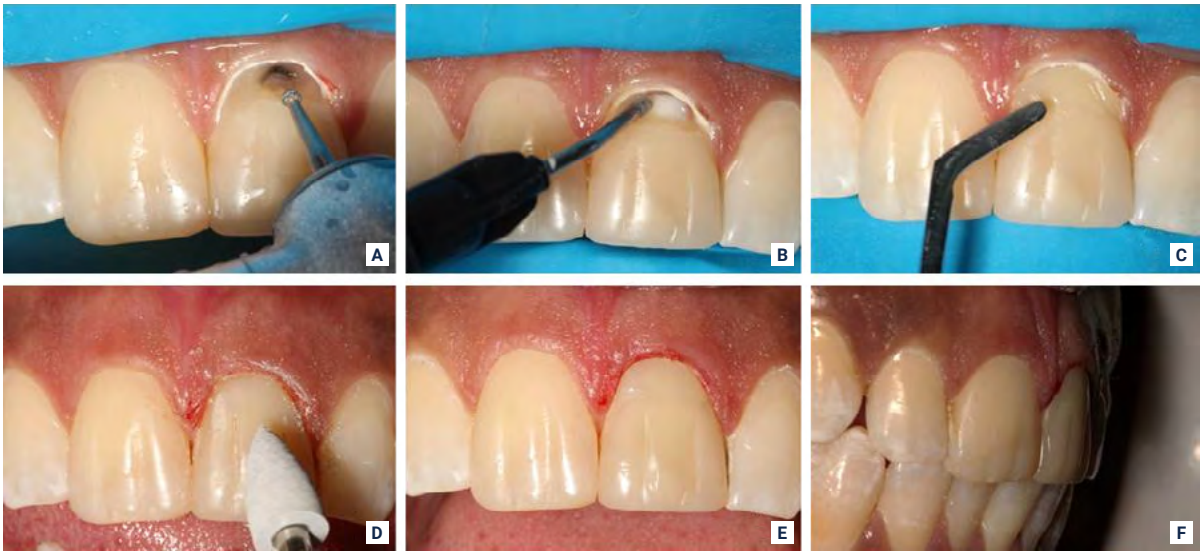

FIGURE 3 · Operative sequence of the reintervention in order to mask the discolored cervical region. **(A)** Preparation in the cervical region. **(B)** Application of a white flowable composite as an opacifying agent. **(C)** Application of dentin and enamel composite over the opacifying agent. **(D)** Polishing the cervical region. **(E)** Immediate aspect. **(F)** Lateral view of the veneers with the cervical region repaired.

the darkened substrate (Figure 3b). After that, the new increments of dentin and enamel composite were inserted (Figure 3c). Immediate finishing and polishing were performed in the repaired region (Figure 3d) improving the aesthetic aspect of the cervical region (Figure 3e and f).

After 18 months the patient was asked to attend the clinic for follow-up and maintenance of the restorations. A slight loss of surface brightness was observed, which was resolved by repolishing (Figures 4a-d). In this step, medium and fine abrasive discs (Sof-Lex Pop-On, 3M, Saint Paul, Minnesota, United States) were used sequentially. Then, an abrasive silicon-impregnated rubber cup (American Burrs, Palhoça, Santa Catarina, Brazil) was used under irrigation. To finish the polishing, diamond paste (Diamond Excel, FGM, Joinville, SC, Brazil) and felt disc were applied to provide smoothness and shine surface.

This case report was approved by the Research Ethics Committee of the Faculdades Unidas do Norte de Minas (FUNORTE), Montes Claros, Minas Gerais state, Brazil (#4.235.320). Participant´s images and information were obtained through signed informed consent.

FIGURE 4 · (A-D) Frontal and lateral view of the veneers after repolishing (18-month follow-up).

Discussion

Direct composite resin restorations are favorable clinical procedures for obtaining color-match, tooth morphology, optical properties such as translucency and opacity, mechanical resistance to fracture and wear[6,7] Through a minimally invasive technique, which can be made in a single session, it can be considered a time-saving procedure by the dentist. Besides, a satisfactory cost-benefit ratio for both the professional and the patient is another vantage of direct composite veneer technique. It is always important for the professional to act quickly and accurately when choosing the restorative technique, searching for the best and most suitable types of dental materials aiming to obtain less noticeable restorations[5].

Composite resin veneers have clinical longevity higher than 80% after 5 years[8]. The annual failure rate was 4.9% in vital teeth and 9.8% in non-vital teeth[9]. Direct veneers in composite resin have some advantages when compared with total crowns or porcelain veneers, especially lower cost and minor preparation of the dental structure in most situations[3,4].

In this work, it was chosen for the direct technique with composite resin due to the possibility of carrying out a simpler treatment, with less clinical time and low cost, since it was a Dental School Clinic for the neediest patients. The copy of the palatal part of the old restorations with condensation silicone was important to gain agility[3,10], since the procedure should be performed in a single session because the patient lived in another city.

A point of discussion, in this case, is the option of not placing a post, since more recent studies have shown that posts are not needed in clinical situations with an adequate dental remnant or even only the presence of a ferrule[11]. Glass-fiber posts have elastic modulus similar to that of dentin. This property is important to minimize the risk of vertical root fractures because of a better stress distribution within the root. However, a possible problem associated to posts is the rate of catastrophic failure.

The risk of nonrepairable failures is higher in teeth restored with glass-fiber posts when compared to teeth with ferrule and direct resin core buildup[11].

Another point of discussion is the need for repair in the cervical region due to a severe discoloration process. A more conservative approach was attempted at first to preserve tooth structure since the tooth had an important loss of structure. However, in the reevaluation, an undesirable aesthetic effect was observed in this region. Then, it was performed a repair applying the same composite resins used previously, however, blocking this darkened substrate with a white fluid resin. The repair, for a long time, was considered an inappropriate procedure, and the removal of the entire restoration was recommended. However, nowadays there is already scientific basis and follow-up studies that show the success of this minimally invasive therapeutic approach[12].

The final result of the treatment was considered satisfactory, with evident improvement in the color and appearance of the teeth, having a smooth and polished surface. The correct finishing and polishing are essential to guarantee adequate restoration contour, proximal contact, and secondary and tertiary anatomy. This clinical step can affect relevant aspects of the restoration, such as color change, accumulation of plaque, and wear on the resin over time. The finishing and polishing provide the restoration a good reproduction of tooth details such as macro and microtexture, the longevity of color and shine, being essential in the aesthetics and clinical success of long-term restorations[3,10].

Clinical performance and longevity of composite resin restorations should always be evaluated due to the possibility of post-operative sensitivity, marginal failures, secondary caries, fractures, material wear, and color change[9,12]. In the present case report, after 18 months of completion of treatment, the patient was called to attend the clinic for follow-up and maintenance of the restorations, in order to ensure greater longevity of the work

performed. It was identified that the restorations remained in good condition after this period, requiring only a repolishing to recover shine and smoothness, that as expected for any polymeric material decreased slightly.

Conclusion

The use of direct composite veneers in anterior discolored teeth has proved to be an efficient aesthetic and functional treatment due to practicability and cost-efficiency. The composite resin material is highly recommended for several reasons, one of them for the possibility of repair, which was necessary to be done in the present clinical case. The 18-month follow-up showed adequate function and aesthetics and enabled social reinsertion of the patient, bringing aesthetic satisfaction with less wear on the remaining dental structure.

References

1 - Chou JC, Nelson A, Katwal D, Elathamna EN, Durski MT. Effect of smile index and incisal edge position on perception of attractiveness in different age groups. J Oral Rehabil. 2016; 43(11): 855-62.

2 - Baratieri LN, Monteiro Junior J, Andrada MA, Aracari GM. Composite resin veneers: a new technique. Quintessence Int. 1992; 23(4): 237-43.

3 - Torres CRG. Modern operative dentistry: principles for clinical practice. Switzerland AG: Springer International Publishing; 2020.

4 - Yanikian C, Yanikian F, Sundfeld D, Lins R, Martins L. Direct composite resin veneers in nonvital teeth: a still viable alternative to mask dark substrates. Operative dentistry. 2019; 44(4): E159-e66.

5 - Korkut B. Smile makeover with direct composite veneers: a two-year follow-up report. J Dent Res Dent Clin Dent Prospects. 2018; 12(2): 146-51.

6 - Ferracane JL. Resin composite: state of the art. Dent Mater. 2011; 27(1): 29-38.

7 - Villarroel M, Fahl N, Sousa AM, Oliveira Junior OB. Direct esthetic restorations based on translucency and opacity of composite resins. J Esthet Restor Dent. 2011; 23(2): 73-87.

8 - Alothman Y, Bamasoud MS. The Success of Dental Veneers According to preparation design and material type. Open Access Macedonian Journal of Medical Sciences. 2018; 6(12): 2402-8.

9 - Coelho-de-Souza FH, Goncalves DS, Sales MP, et al. Direct anterior composite veneers in vital and non-vital teeth: a retrospective clinical evaluation. J Dent. 2015; 43(11): 1330-6.

10 - Dietschi D, Fahl Junior N. Shading concepts and layering techniques to master direct anterior composite restorations: an update. Br Dent J. 2016; 221(12): 765-71.

11 - Magne P, Lazari PC, Carvalho MA, Johnson T, Del Bel Cury AA. Ferrule-effect dominates over use of a fiber post when restoring endodontically treated incisors: an in vitro study. Operative dentistry. 2017; 42(4): 396-406.

12 - Wilson N, Lynch CD, Brunton PA, et al. Criteria for the Replacement of Restorations: academy of operative dentistry european section. Operative dentistry. 2016; 41(s7): S48-S57.

Abordagem restauradora direta com resina composta em dente escurecido: um relato de caso

Resumo

Objetivo: discutir a sequência clínica e indicações de faceta direta em resina composta para mascarar dente escurecido. Relato de caso: Paciente do sexo masculino, 18 anos de idade, compareceu a uma Clínica-Escola para tratamento dos incisivos centrais superiores. Durante o exame inicial, o paciente relatou ter caído durante a infância e fraturou os dentes 11 e 21. O dente 21 já havia sido tratado endodonticamente e o paciente queixava-se da cor escurecida, e o 11 estava fraturado há bastante tempo. Resultados: Foi constatada restauração de resina composta classe IV insatisfatória, com resto de material endodôntico no dente 21 e fratura dentária classe IV no elemento 11. Foi realizada a limpeza dos elementos, remoção de materiais restauradores e confecção de facetas diretas de resina composta por meio da técnica da muralha de silicone. Em uma sessão posterior à confecção das facetas foi realizada a etapa de acabamento e polimento das restaurações, sendo reproduzidas algumas das características peculiares de dentes jovens, condizentes com a idade do paciente, como macro e microtexturas. Conclusão: A utilização de facetas diretas em resina composta mostrou-se eficiente para restabelecer a estética de dentes escurecidos e fraturados, devolvendo a satisfação estética por meio da transformação do sorriso do paciente.

PALAVRAS-CHAVE: Resina composta; Facetas dentárias; Descoloração de dente.

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