FGM

Vittra APS UNIQUE

Universal chroma composite

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Vittra APS UNIQUE

1. INTRODUCTION

Composites occupy a prominent place among dental materials and are widely the dental restorative materials of choice, for being esthetic, conservative and for having good mechanical properties, which makes them suitable for multiple clinical applications1. The shade variability of natural teeth has led to the constant development of their composition, including different shades and opacities, usually by using the Vita Classical shade guide as a reference2.

The layering technique for composite restorations has been proposed since 19803. To simulate the optical properties of a natural tooth, this technique involves the use of composites with different chromas and opacities for each layer. Although the layering technique demonstrates adequate results regarding shade matching, this procedure can be complex, requiring greater technical skills, more clinical time on the chair and a broad understanding of the optical behavior of composites and their interaction with dental structures4.

Restorative materials and techniques that allow the use of simplified clinical protocols are highly desirable among dentists in order to reduce appointment length and minimize technique sensitivity5. As shade selection can be challenging and subject to variables such as the dental substrate and professional experience, the tendency of simplifying shade selection has led to the development of so-called universal-chroma composites, which aims to simulate the color of the dental substrate, mimicking different tooth shades and producing a “chameleon” effect with by using only a single shade.
Within this context, FGM Dental Group brings to the market Vittra APS Unique, a universal-chroma composite, whose main advantage is an enhanced color adjustment to the dental substrate by using only a single composite.

2. PRODUCT DESCRIPTION

Light-curing composite, for all dental shades, indicated for anterior and posterior restorations and suitable for all classes of cavities. The composite is radiopaque, with a total inorganic filler content of 72% to 80% by weight (52% to 60% by volume), and an average particle size between 0.8 and 0.9 microns. It does not contain Bis-GMA or BisEMA in its formulation, following the current trend of products manufactured without Bisphenol A (BPA). The composite has APS, which is an acronym for Advanced Polymerization System, as photoinitiator system. It consists of a combination of different photoinitiators that interact with each other, amplifying the curing capacity of the light emitted by light-curing devices.

3. BASIC COMPOSITION

Active ingredients: mixture of methacrylate monomers, photoinitiating composition (APS), co-initiators, stabilizers and silane, boron aluminum-silicate glass, silicon dioxide.

4. KEY CHARACTERISTICS

UNIVERSAL-CHROMA: From Bleach to D4 with just one shade of composite! It does not require layering in most cases and allows the use of a simple layering technique, without using different degrees of opacity/translucency.

HIGH ESTHETICS AND MECHANICAL RESISTANCE: In addition to presenting excellent shine and polishing, it has high levels of bending resistance to withstand the stress resulting from masticatory forces.

CHAMELEON EFFECT: It copies the color of the dental substrate during the polymerization process, achieving high mimicry provided by the chromatic simulation characteristics of the composite.

EXCLUSIVE APS TECHNOLOGY (ADVANCED POLYMERIZATION SYSTEM): Longer working time even under the light of the reflector, more efficient light-curing, enhanced mechanical properties, superior esthetics with easier shade transmission and mirroring provided by the more transparent photoinitiators of the APS system (compatible with all devices that emit blue light).

BPA-FREE, ENSURING SAFETY AND HEALTH: Safety and health for the patient! Although the amount of BPA released into saliva by resinous materials is much lower than the safety limit dose, there is a worldwide trend to remove BPA from restorative dental products.

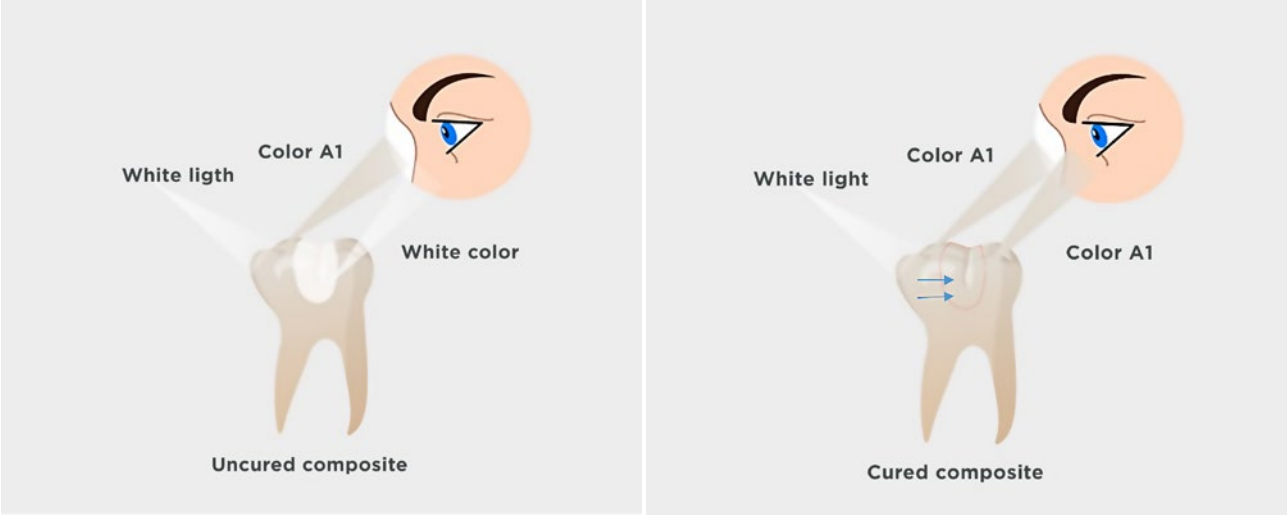
IT FOLLOWS TOOTH WHITENING: Restorations performed with Vittra APS Unique follow the post-bleaching shade change, reducing the need to replace restorations due to differences in tone.

IT SAVES TIME AND MONEY: No shade selection is required and, therefore, it provides faster completion of restorative procedures, increasing professional productivity and reducing the inventory of composite shades.

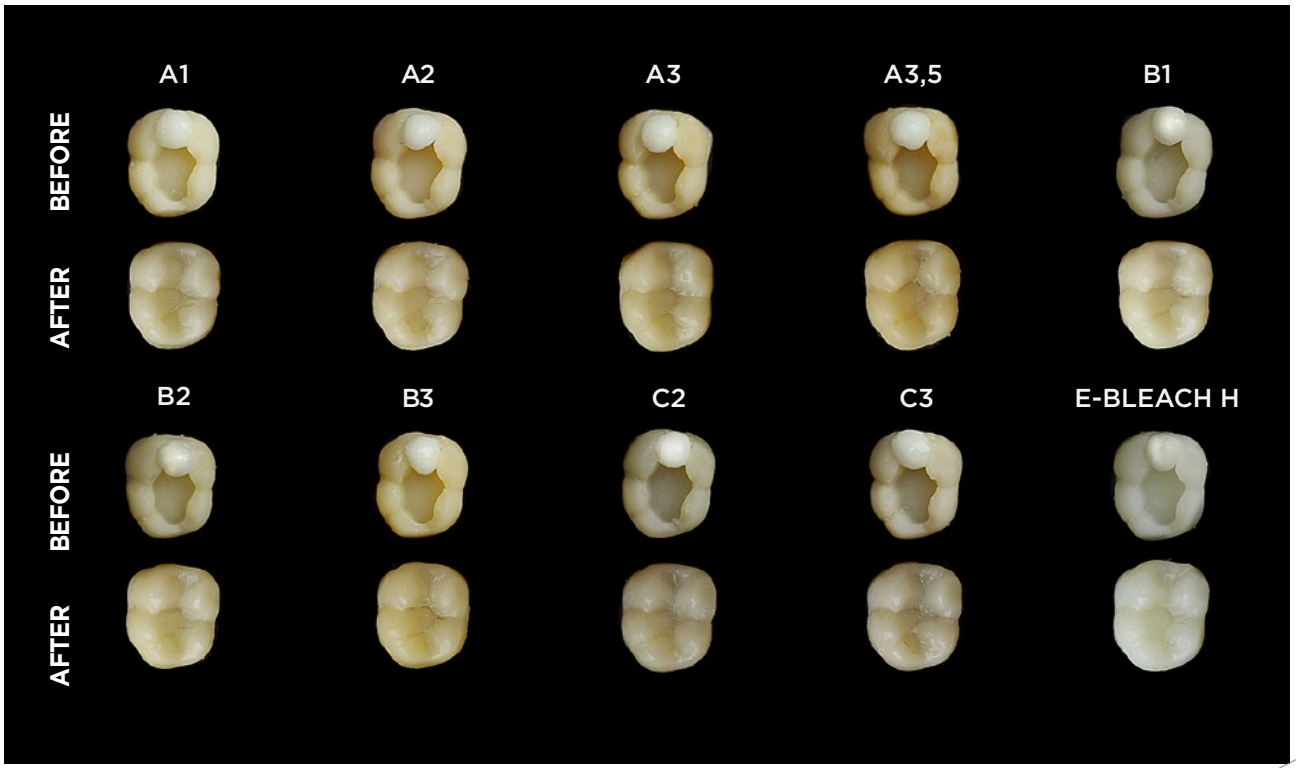
* Check availability in your country.

4.1 **MECHANISM OF ACTION**

Its mechanism of action employs resin matrix technology and inorganic fillers balancing, whose optical refraction index is similar to that of the dental structure, in addition, the most transparent photoinitiators from the exclusive APS system allow shade transmission and mirroring to be facilitated; leading to efficient color mimicry from Bleach to D4 and enabling the dental surgeon to adopt a simple incremental technique, without using different degrees of opacity/translucency. In figure 1a it is possible to visualize the incidence of light and the reflection of the composite increment in white color in an initial aspect. Figure 1b shows the appearance after light-curing the composite, the increment reflects the color of the adjacent dental substrate.



4.2 **FROM BLEACH TO D4, WITH ONLY ONE COMPOSITE!**

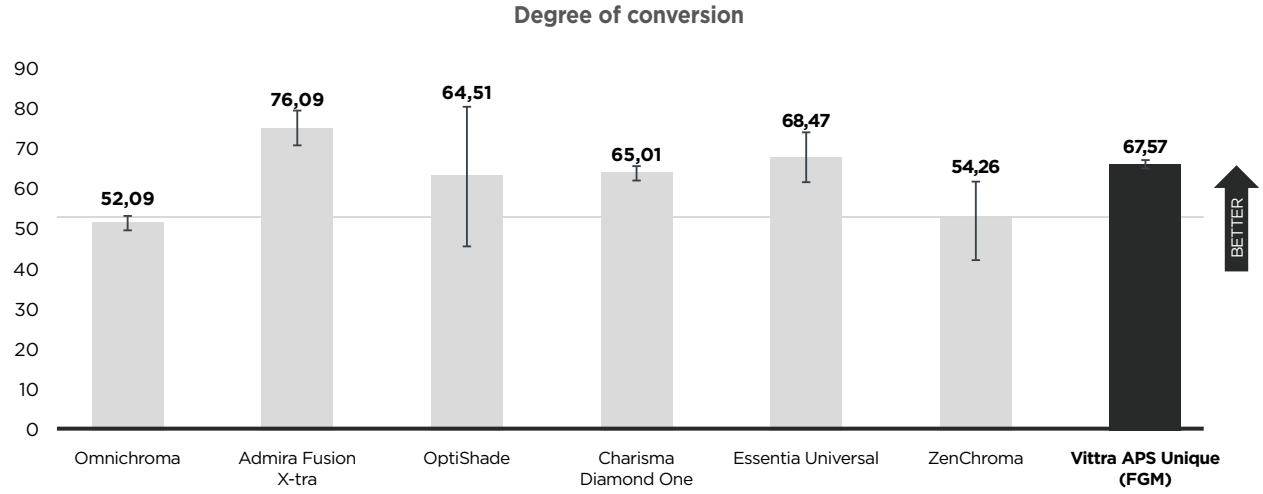


5. PHYSICAL CHEMICAL PROPERTIES

5.1 **DEGREE OF CONVERSION**

The degree of conversion provides information on how much the monomers effectively react and transform into polymers. The measured result depends on the monomers used, the effectiveness of the photoinitiator system and the optical properties of the monomeric mixture and fillers (when the effectiveness of the photoinitiator is low and the product has a certain opacity, there may be damage to the degree of conversion). From a theoretical point of view, a degree of conversion of 100% would indicate that all monomers reacted and formed a single polymer molecule. From a practical point of view, the possibility of having 100% conversion is practically impossible as there are several chemical and physical issues involved that prevent it. A low degree of conversion indicates that few molecules reacted and/or that the polymer molecules formed are of low molecular weight, therefore being more soluble and less resistant6.

Considering these concepts, what is sought in dental composites is a degree of conversion of around 50% to 60%, this value comes from the existing experience with dental composites, and which reflects a certain optimal population of monomers converted into polymers of good molecular weight and good resistance. A critical point in this case is to have a good photoinitiator system that guarantees the desired degree of conversion and does so efficiently even at greater depths where the opacity of the composite begins to impede the arrival of light from the light-curing device6. The Vittra APS Unique composite with its exclusive APS photoinitiator system showed a similar degree of conversion to the main market competitors and within a range considered optimal as shown in graph 1.



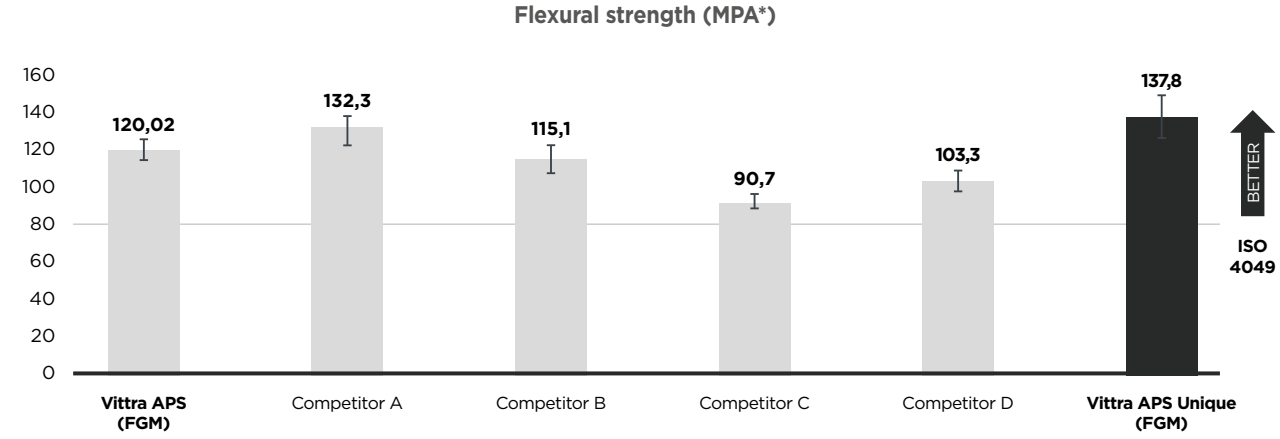
Graph 1

Source: Yılmaz AP et al. Assessment of Micro-Hardness, Degree of Conversion, and Flexural Strength for Single-Shade Universal Composites. Polymers (Basel). 2022 Nov 17;14(22):4987.

5.2 **FLEXURAL STRENGTH**

Flexural strength is a mechanical property that allows the evaluation of the fracture resistance of the composite. It is one of the properties that reflects the quality of the composite formed after curing, result of the important relationship between the polymeric matrix and the fillers used and the ability of photoinitiators to convert monomers into polymers6.

According to graph 2, Vittra APS Unique presents superior flexural strength than the majority of competitive products analyzed, with results up to 70% higher than the reference stipulated by ISO 4049 (>80 MPa). The higher the result, the greater the composite ability to withstand the stress resulting from masticatory forces.

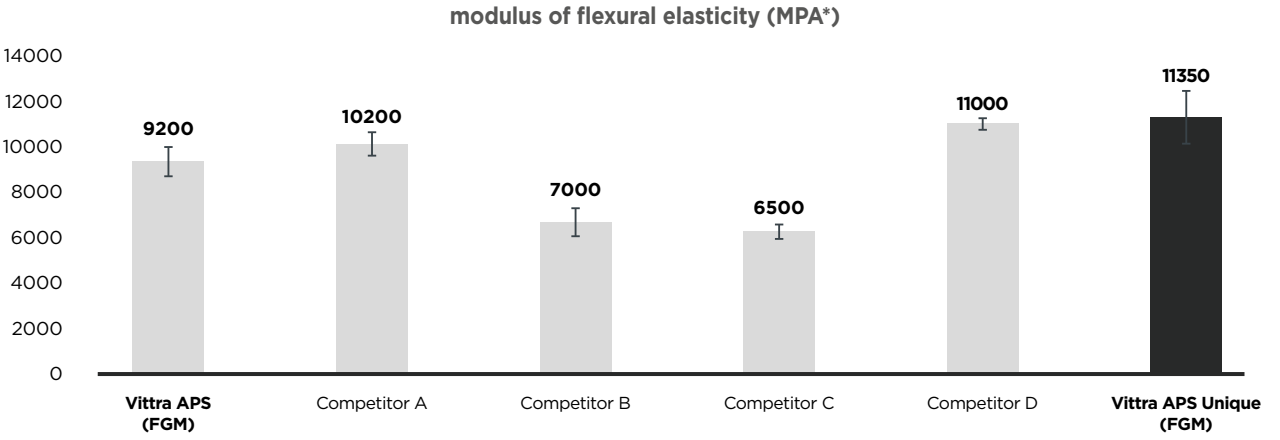


Graph 2

Source: FGM Dental Group internal data.

5.3 **MODULUS OF ELASTICITY**

In the same way as Flexural Strength, the Modulus of Elasticity reflects an intrinsic property of the material in resisting pressure imposed by masticatory forces6. Graph 3 demonstrates that Vittra APS Unique presented results compatible with those declared in the literature for human dentin (between 11700 and 18300 MPa**) and superior to the competitors analyzed, demonstrating excellent resistance to occlusal forces and proving to be suitable for all classes of restorations.

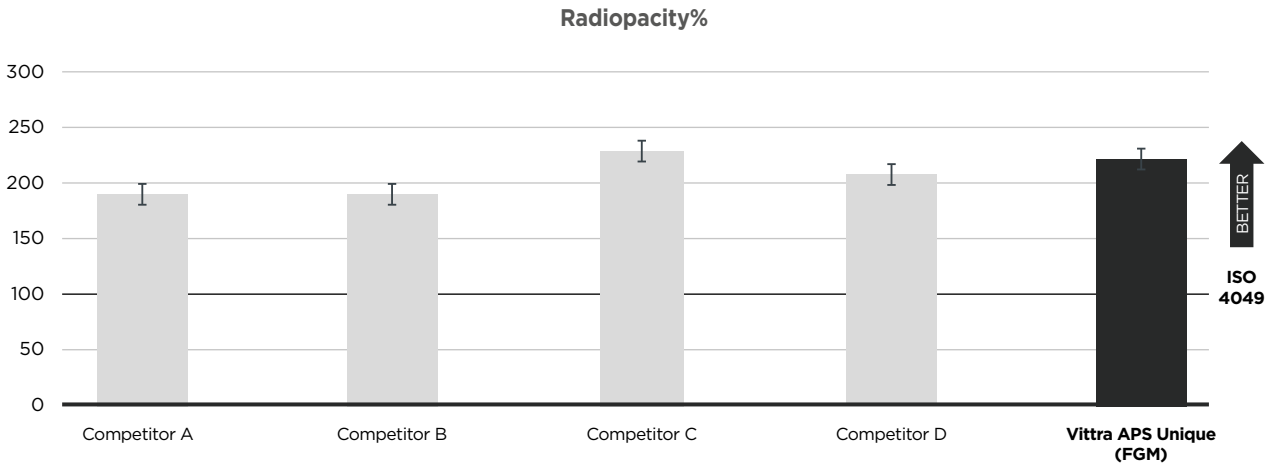


Graph 3

Source: FGM Dental Group internal data. **Anusavice, K.J; Shen, C; Rawls, H.R. - Phillips Materiais Dentários. 12ª Edição. Rio de Janeiro: Elsevier, 2013.

5.4 **RADIOPACITY**

The radiopacity of restorative materials is an important prerequisite that allows the distinction between the restorative material and the tooth and allows the evaluation of the restoration contour, facilitating the visualization of marginal adaptation and the presence of flaws that may occur during material adaptation. The radiopacity of composites is obtained mainly through the inclusion of radiopaque elements with a large atomic number in the form of inorganic particles. In graph 4 it is possible to observe that Vittra Unique APS meets the specifications of the ISO 4049 standard and presents adequate radiopacity.



Graph 4

Source: FGM Dental Group internal data.

5.5 **KNOOP HARDNESS**

Wear resistance and gloss maintenance are properties that depend intrinsically on the composite's mechanical properties, the type of force it is subjected to, and the properties offered by the filler elements that the composite contains. One way to obtain indirect information on the strength that can be expected from the composite's surface is to measure its hardness. The higher the hardness, like porcelain, the greater the abrasion resistance that can be expected from the material.

Composite specimens were made in a circular metal matrix (6 mm thick and 4 mm in diameter). After photopolymerization (1000 mW/cm^2, 30 s on each side) and storage in water (24 hours at 37º C), each specimen was embedded and polished. The surface of each specimen was subjected to the Knoop indenter with a 10 g load for 15 s at several points

6. CLINICAL CASE

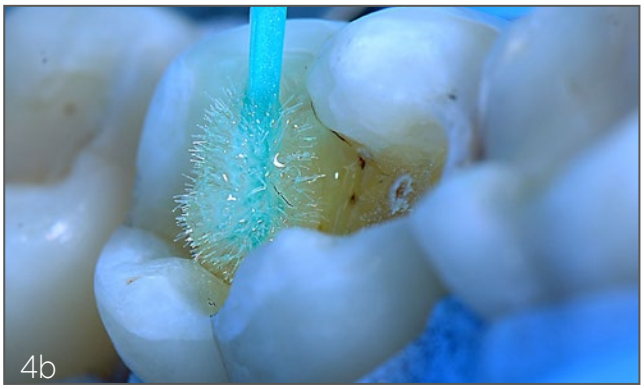
Author: PhD Fábio Sene

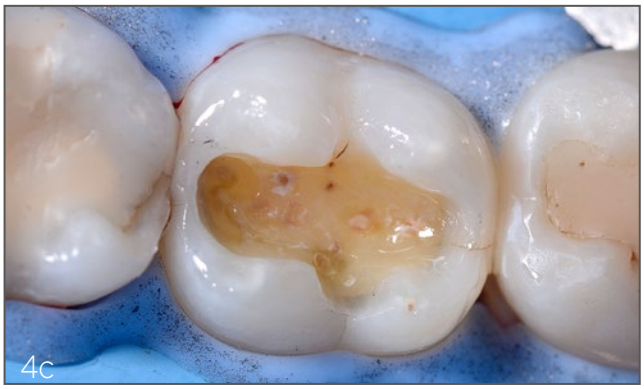
35-YEAR-OLD FEMALE PATIENT.

Main Complaint: Dissatisfaction with the class I amalgam restoration in tooth 37.

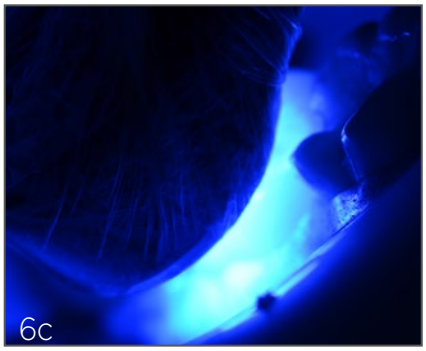
1 | Initial image showing the restoration in amalgam.
2 | Absolute isolation and removal of the amalgam.
3 | Acid etching of the cavosurface enamel with Condac 37% for 30 seconds.

4a | Use of the Ambar Universal APS adhesive.
4b | Application of Ambar Universal APS to dry dentin with the self-etching technique. Note the translucent aspect due to the APS technology.
4c | Adhesive applied and photoactivated.





5 | Vittra APS Unique universal chroma composite.



6a | Application of the Vittra APS Unique composite in layers. Note the whitish opaque color of the composite before photoactivation. **6b** | Occlusal view of the composite increment and the opaque white color. **6c** | Photoactivation. **7a** | Reconstruction of the mesiolingual cusp. **7b** | Chromatic result after photoactivation. **8** | Reconstruction of the mesiobuccal cusp.

9 | Finished restoration. Note the incredible chromatic mimicking of the composite Vittra APS Unique. **10** | Result after the polishing of the restoration. **11** | Final result after the removal of the isolation. Note how the composite has absorbed the optical characteristics of the dental structure, integrating completely with the tooth, producing a unicolored restoration, with a polychromatic effect.

7. REFERENCES

1. Denehy GE. A direct approach to restore anterior teeth. Am J Dent. 2000 Nov;13(Spec No):55D-9D. PMid:11763919

2. da Costa J, Fox P, Ferracane J. Comparison of various composite shades and layering technique with a shade guide. J Esthet Restor Dent. 2010;22(2):114-124.

3. Dietschi D, Fahl N Jr. Shading concepts and layering techniques to master direct anterior composite restorations: an update. Br Dent J. 2016;221(12):765-771.

4. Dietschi D. Free-hand composite restorations: a key to anterior aesthetics. Pract Periodontics Aesthet Dent. 1995;7(7):15-25. quiz 27.

5. Fahl N Jr. Single-shaded direct anterior composite restorations: a simplified technique for enhanced results. Compend Contin Educ Dent. 2012;33(2):150-154.

6. Carvalho E, Bauer M, Pailover P, Malaquias P, Gutierrez F, Reis A, Bauer J, Loguercio A. Universidade Estadual de Ponta Grossa (UEPG) e Universidade Federal do Maranhão, 2016.

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