

Otimização de restaurações estéticas anteriores associando barreira palatina e guia de silicone: relato de caso

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ABSTRACT

There is a growing demand for esthetic improvement among patients seeking a harmonious smile, which leads dentists to a constant need for professional development and mastery of techniques that can be employed to achieve satisfactory and more predictable results. This article aims to present a clinical case of anterior esthetic restorations, combining the use of a palatal barrier and a transparent silicone guide. A 22-year-old male patient, who is a smoker, sought treatment at the Dental Clinic of the State University of Maringá (UEM) dissatisfied with his previous restorations. Upon clinical examination, discoloration of all teeth and a visible contrast in the tooth-restoration line of elements 11 and 21 were observed. The patient was initially subjected to at-home bleaching treatment, followed by diagnostic wax-up to fabricate the palatal barrier and the transparent silicone guide. The old restorations were removed and a new restoration was made, with the aid of the palatal barrier, which shaped the palatal shell, as well as the transparent silicone guide, which shaped the marginal ridges and the buccal surface. This technique proved to be highly effective, reducing clinical time and facilitating the procedure, as it minimizes the manual skill required by the operator to achieve esthetic excellence.

Keywords: Composite resins. Dental esthetics. Permanent dental restoration.

RESUMO

É crescente a exigência estética dos pacientes em busca de um sorriso harmonioso, o que leva o cirurgião-dentista à constante necessidade de aperfeiçoamento profissional e de domínio de técnicas de que possa lançar mão para a obtenção de resultados satisfatórios e mais previsíveis. Este artigo objetiva apresentar um caso clínico de restaurações estéticas anteriores, associando o uso da barreira palatina e do guia de silicone transparente. Paciente do gênero masculino, de 22 anos, fumante, buscou atendimento na clínica odontológica da Universidade Estadual de Maringá (UEM) insatisfeito com suas restaurações anteriores. Ao exame clínico, foi observado escurecimento de todos os dentes e visível contraste da linha dente-restauração dos elementos 11 e 21. O paciente foi, primeiramente, submetido ao tratamento clareador caseiro, seguido do enceramento diagnóstico para confeccionar a barreira palatina e o guia de silicone transparente. As restaurações antigas foram removidas e as novas restaurações foram confeccionadas em resina composta com auxílio da barreira palatina, gerando a concha palatina, assim como do guia de silicone transparente, que deu forma às cristas marginais e à face vestibular. Essa técnica se mostrou bastante eficiente, reduzindo o tempo clínico e facilitando o procedimento, uma vez que minimiza a demanda de habilidade manual por parte do operador para obter excelência estética.

Palavras-chave: Estética dentária. Resinas compostas. Restauração dentária permanente.



INTRODUCTION

The definition of beauty has always been present in several debates, being a subjective and constantly evolving concept, often subjugated to cultural trends, the demand for esthetic procedures is growing, what places the dentist as a protagonist in the follow-up of beauty (Ding, 2021; Sisti, Aryan & Sadeghi, 2021).

The restorative dentistry evolved a lot since the emergence of the first composites and adhesive systems, demanding constant dentist's professional improvement, knowing different techniques and specificities of each restorative material. Difficult techniques, and incorrect use of opacifiers and opaque composites can take the professional to add a bigger amount of composite, causing excessive volume and over contouring, creating an artificial tooth look (Cardoso et al., 2011; Wittmann, Giacomelli, Longo & Sene, 2013).

When it comes to class IV restorations, a widely spread technique is called "buccal-lingual", in which a palatal barrier made of silicone through waxed models is used. The first layer of enamel composite is placed directly over the silicone guide in order to obtain the lingual profile, width and position of the incisal edge of the future restoration. Then the dentin and effect layers (when necessary) can be precisely adapted three-dimensionally, providing conditions for a satisfactory esthetic result (Dietschi, 2008).

Another technique that can be used to guide confection of the vestibular wall in restorative procedures is the utilization of an acrylic composite or acetate matrix to reproduce the external surface of this plaster model or its waxing in order to easily reproduce the buccal surface. This technique increases the dentist's precision and assertiveness. The elasticity and precision of the transparent silicone (Scan Translux, Yllor) facilitate the insertion of the guide, as well as the correct reproduction of the vestibular anatomy (Sá & Pascotto, 2004; D'Altoé, 2012).

The growth of the search for esthetic dental procedures accompanies the advances, and the expansion of techniques and materials intended for this purpose (Barbosa, Neres & Amaral, 2021). Therefore, it is extremely important for the dental surgeon to master these techniques and also to pay attention to essential details such as size, shape, contour, surface texture and careful choice of color (Basting, Carlini, Serra & Pimenta, 2000; Sá & Pascotto, 2004). In this context, the present work objects to present resolution of a clinical case, in which the anterior incisors had both esthetically and functionally unsatisfactory class IV restorations. For such, palatal wall and the transparent silicone guide were used in association. The techniques were used in synergy to obtain advanced esthetic results, reducing manual skill need and optimizing clinical time.

CASE REPORT

A male patient, 22 years old, smoker, searched for the State University of Maringa (UEM) dental clinic unsatisfied with the darkness of his anterior restorations. He reported that his restorations were made when he was very young, after fracturing his incisors in an accident. In the clinical exam, it was observed the presence of carious lesions, gingival inflammation due to the presence of biofilm and dental calculus, enamel pigmentation and dental darkening due to cigarette use. He also presented unsatisfactory class IV anterior restorations on elements 11 and 21 (Figure 1).

Figure 1

Extraoral photograph.



Source: The authors.

Note. A: Front view. B: Lateral right view. C: Lateral left view.

After some X-rays were taken (Figure 2), a treatment plan was created in order to restore the patient's oral health, allowing the resolution of the main complaint. Initial and basic periodontal treatment of all dental elements was performed to reduce gingival inflammation. After the periodontal treatment, elements with active carious lesions were restored and prophylaxis was performed at all clinical times. Due to the report of fracture, teeth 11 and 21 were submitted to the pulp vitality test, which indicated vitality for both. Oral hygiene instruction was given and the patient was informed about the importance of maintaining oral health for the follow-up and success of the proposed treatment.

Figure 2

Initial X-ray.



Source: The authors.

After these procedures, impressions were taken of both dental arches with alginate (Avagel, Dentsply Sirona) in order to manufacture acetate plates for dental bleaching. The patient was instructed to perform at-home bleaching with 22% carbamide peroxide for one hour a day for 15 days. He was then informed about the importance of ceasing use of cigarettes, especially during this stage of treatment.

The patient was dispensed until bleaching was completed.

With the conclusion of bleaching treatment (Figure 3), the patient was molded again using alginate (Hydrogum 5, Zhermack) in order to allow a faithful copy with low distortion of the desired area. Through these molds, the study models were performed with special plaster type IV (Vênus, Yamay), that assisted in the planning of the case. This model was used for diagnosis wax-up, in which plaster was worn in the area corresponding to the old restorations and the future restorations were wax sculpted. Still in wax and with the help of a sculptor Holleback n. 3 (Quinelato), the anatomy was created, with lines of development, areas of reflection and parakymacies (Figure 4).

Figure 3

Intraoral photograph.

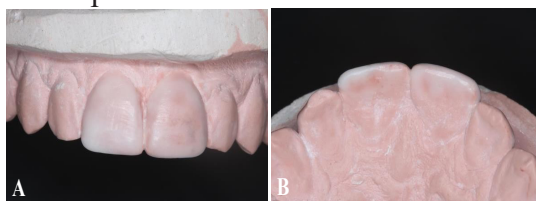


Source: The authors.

Note. A: Bleached upper anterior teeth on black background. B: Patient in maximum usual intercuspation (right view, whitened teeth). C: Patient in maximum usual intercuspation (left view, whitened teeth).

Figure 4

Wax-up in model.



Source: The authors.

Note. A: Anterior view. B: Incisal view.

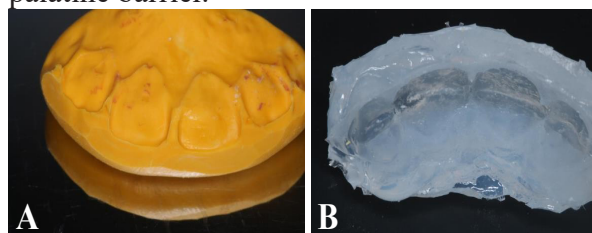
After the models were waxed, the palatal surface was molded with additional silicone (Express XT, 3M) and the palatine barrier was made (Figura 5A). The anterior teeth were also molded with transparent silicone (Scan Translux, Yllor) along the entire length of the crown, thus obtaining a guide that was later used to shape and contour the buccal, mesial and distal faces of the restoration (Figure 5B). It is important to say that, in this case, both the palatal barrier and the transparent silicone guide helped the dentist to efficiently restore and follow the anatomy of the waxed model, eliminating the need for major modifications in the final restoration on all surfaces.

So, the patient was called to perform the restorative procedure. The restorative technique started with prophylaxis and color selection according to the Vita scale (VITA Classical). After bleaching, the color closest to the maxillary central incisors was A1 (Figure 6). Once the color was selected, the removal of the old restoration of tooth 11 began. This process was carried out under absolute isolation (Figures 7A e 7B) with the aid of a

spherical diamond tip 1014 (KG Sorensen) and cylindrical 1091 (KG Sorensen) (Figures 7C e 7D). The finishing, as well as the making of an elongated bevel, was carried out with the aid of a 1111 diamond bur (KG Sorensen) (Figure 7E). Due to the degree of darkening of the substrate, the bevel performed was deeper and less conservative than conventional restorations, because there would be a need for a thicker layer of composite to be able to effectively mask this darkening (Figure 7F). The palatine barrier was taken into position to assess its adaptation (Figura 8A).

Figure 5

Molding of the palatine face with addition silicone (Express XT, 3M) and making of the palatine barrier.



Source: The authors.

Note. A: Palatal barrier. B: Transparent silicone guide.

Figure 6

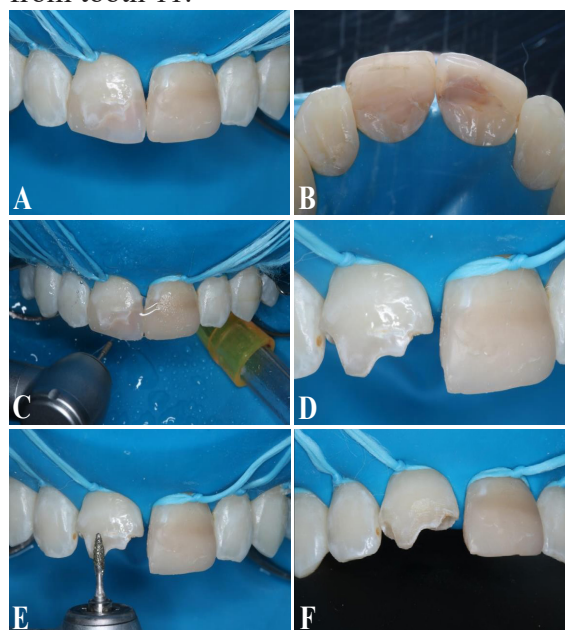
Color selection.



Source: The authors.

Figure 7

Process of removing the old restoration from tooth 11.



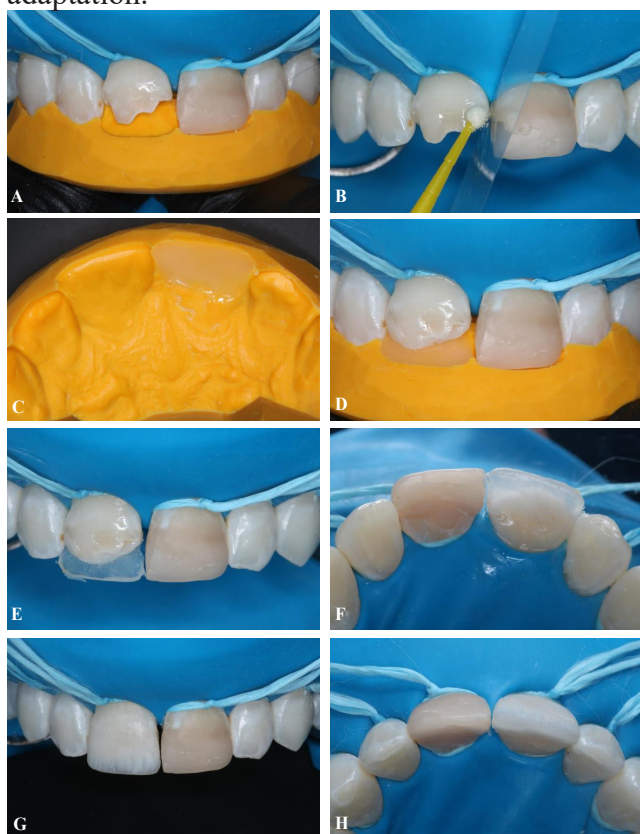
Source: The authors.

Note. A: Absolute isolation. B: Absolute isolation (palatal view). C: Removal of old restoration. D: Tooth without the old restoration. E: Bevel making. F: Tooth with bevel.

Thus, the enamel was etched with 37% phosphoric acid (Attaque Gel, Biodinâmica) for 30 seconds and dentin for 15 seconds. Subsequently washing with plenty of water and drying with air jets protecting the dentin. The adjacent teeth were protected using a polyester matrix (Bandedá et al., 2010). The application of the conventional two-step adhesive (Ambar, FGM) was started with the aid of a microbrush, in an active way (Figure 8B). Long distance air jets were used to evaporate the solvents and the adhesive was light cured. Subsequently, the composite was positioned on the palatal barrier, taken into position and light cured in order to mimic the palatal concha (Figures 8C, 8D, 8E e 8F). Photopolymerization was carried out with the apparatus Poly Wireless (Kavo) at 1100 mW/cm² for 20 seconds. The composite used was Forma WE (Ultradent). After some adjustments with the scalpel blade, portions of dentin composite were rested on the already made shell (Figures 8G e 8H); the composite chosen for this function was Light Dentin LD (GC).

Figure 8

Palatine barrier placed in position for evaluate its adaptation.



Source: The authors.

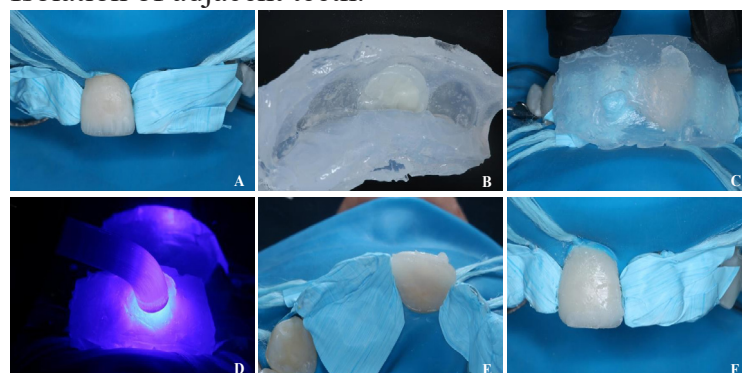
Note. A: Palatine barrier in position. B: Adhesive application. C: Palatine barrier + enamel composite. D: Palatine barrier in position. E: Palatine composite shell (palatal view). F: Composite portion of finished dentin. G: Composite composite portion of finished dentin (incisal view).

After this stage, the adjacent teeth were isolated using isotape TDV (Figure 9A). Inside the transparent silicone guide, on the buccal face, the resins Palfique LX5 color WE (Tokuyama) and Grandia Direct CT from (GC) were positioned, in this order, one on the top of the other and a small hole was made in the guide, allowing the

composite to flow (Figura 9B). Therefore, the transparent silicone guide was brought into position and pressed, the surplus composite leaked through the hole (Figure 9C). Photopolymerization was carried out using the guide (Figure 8D) for 20 seconds and complemented for more 20 seconds by buccal and lingual without the guide. The composites were applied directly to the inner part of the transparent silicone guide on the buccal part. The silicone guide was a copy of the wax-up. After polymerization (Figures 9E e 9F), the guide was removed and the composite fragment that light cured inside the perforation was worn down using diamond burs 3216 F e FF.

Figure 9

Isolation of adjacent teeth.



Source: The authors.

Note. A: Adjacent teeth isolated with Isotape TDV. B: Transparent silicone guide with composites. C: Guide positioning. D: Photopolymerization. E: Last portion of light cured dentin composite (vestibular view). F: Last portion of light cured dentin composite (palatal view).

With the aid of sandpaper discs and diamond tips 4132 e 3216 FF (KG Sorensen), the new restoration was given the first finishing, the burrs from small defects inside the transparent silicone guide were removed and an initial polishing was performed using felt discs (Figure 10). The occlusion and occlusal interferences were verified. The patient was dismissed and asked to return the following week to begin the restoration of tooth 21.

Figure 10

Restoration after first finishing and polishing.



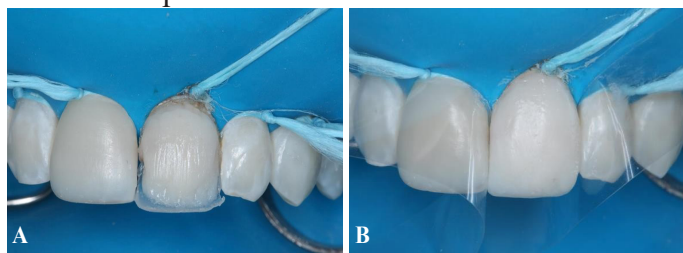
Source: The authors.

Upon returning, the restoration of tooth 21 was started, which followed the same clinical sequence as the previous tooth, the palatine barrier and the transparent silicone guide were saved. In contrast to tooth 11, tooth 21 had a much darker substrate; after removal of the old restoration, it was possible to observe a large amount of sclerotic dentin. To work around this problem, a longer

and deeper bevel was made, so that a thicker layer of dentin composite (opaque) could be obtained, hiding the substrate (Figures 11A e 11B).

Figure 11

Restoration process of tooth 21.



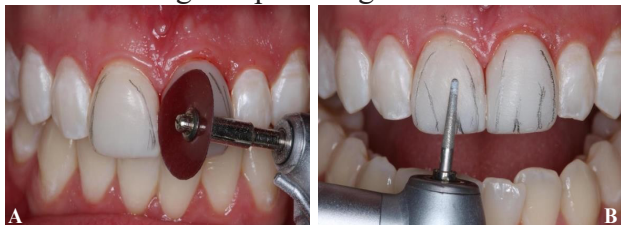
Source: The authors.

Note. A: First dentin composite increment of tooth 21. B: Last dentin composite increment of tooth 21.

After the two restorations were completed, the finishing and final polishing were carried out. For this purpose, sandpaper disks (3M) of different grains, felt disks and polishing paste were used. With the help of graphite, the flat and convex areas were demarcated, as well as the developmental grooves on the vestibular surface (Figure 12A). Using a 3145F diamond bur, the development grooves were made (Figure 12B). By means of sandpaper and felt discs with polishing paste, the finishing and polishing of the restorations were finalized.

Figure 12

Final finishing and polishing of restorations.



Source: The authors.

Note. A: Demarcation of convex and flat areas and use of sanding discs. B: Demarcation of the development grooves and use of the 3145f diamond bur.

In comparison between pre-procedure and post-procedure (Figures 13A e 13B), it is possible to notice a significant improvement in the esthetics of the smile. The final restoration gave naturalness, and returned both the shape and the natural contour of the teeth (Figure 13C).

Figure 13

Comparison between the steps.



Source: The authors.

Note. A: Pre-procedure. B: Post-procedure. C: Immediate result.

DISCUSSION

In order to make direct facets, it is necessary,

besides mastering a good technique, to carefully choose the restorative material, not only taking into account their physical properties, but also their esthetic aspects. This planning consists in observing several visual elements produced by a certain type of composite, so that, after restoration light cure, it properly mimics the anatomy and incidence of light, similar to the natural tooth. Hue, and value are visual elements present in a composite, and the choice of these must be assertive so that the case is conducted with excellence (Baratieri & Monteiro, 2002; Hirata & Carniel, 2004; Sá & Pascotto, 2004).

Regarding teeth that have a darkened substrate, the use of opacifying composites becomes quite effective and should be taken into account when choosing the composite (Cabral & Trauth, 2017; Reis, Olivera, Vilela & Menezes, 2018). In these cases, the presence of a darkened substrate can negatively interfere with the final appearance of the restoration, evidenced by the translucence of composites. In order to avoid this, the dentist needs to choose materials that have in their composition elements that make them opaque, so that light rays can not reach the darkened substrate and be reflected to the eyes, thus the color of the composite overlaps the color of the substrate (Silva, Pezzini, Lopes, & Andrada, 2006).

In this case, it was not necessary to use opacifiers, only the composite light dentin LD (GC) which has an excellent degree of opacity, sufficient to hide the substrate without producing an artificial appearance due to an excess of opaque elements.

In all cases, the dentist needs to seek maximum preservation of the tooth structure, however, in some cases, tooth preparation is necessary so that the final restoration can be adequate to esthetic standards (Marques, 2005). In this case, after the total removal of the old restoration, it was possible to observe a great darkening of the underlying structures. Thus, in order to achieve a thickness of dentin composite that was sufficient to hide the substrate, it was necessary to use a deeper elongated bevel with greater preparation of the tooth structure.

The transparent silicone guide provided a good idea of how much structure should be removed, as this showed the final shape of the restoration. If it was not used, there would be a greater chance of mistake in the amount of preparation, leading the dentist to compensate with the excessive addition of composite on the buccal surface, which would lead to a rounded shape, not consistent with the dental anatomy (Baratieri & Monteiro, 2002).

The use of guides for direct facets was advocated by Baratieri and Monteiro (2002), in which an acrylic composite guide was used for the same purpose. One of the main disadvantages of this material is the possibility of bubble formation and its opacification, also being rigid and inflexible, which makes it difficult to insert the guide at the site of interest. To avoid these problems, it is necessary to use colorless acrylic with thin walls. A variant of this

technique is the use of a guide made of acetate (Sá & Pascotto, 2004), a negative point of this technique would be the need for interaction with the laboratory to carry out the vacuum pressing.

The technique of this work using transparent silicone to create the guide has positive peculiarities. The first is that, with transparent silicone, light can easily pass through it during light curing. Another advantage is the fact that silicone has excellent elasticity, precision and resilience, so that even after being deformed, it returns to its initial shape. This provides easier insertion of the guide and allows it to bypass regions of interference more easily, without losing the copied information (D'Altoé, 2012). Moreover, the guide can be easily made in the dental office, without laboratory assistance.

The results obtained by the three techniques are quite similar (acrylic composite guide, acetate and transparent silicone) as they all allow for greater predictability of the final result and facilitate the completion of the restoration in the appropriate dimensions, resulting in a very satisfactory final result. Taking into account all the advantages presented, it is possible to state that the combination of techniques used (palatal barrier and transparent silicone guide) work in synergy in obtaining direct facets with a good degree of detail, even for less experienced dentists, facilitating handling and the modeling of composite in appropriate proportions.

The association of the techniques presented in this work are alternatives that can help less experienced professionals to achieve greater resolution in their clinical cases, as well as professionals who are faced with cases in which there is the need for a more elaborated anatomical characterization and the technical difficulty in reproducing certain details intrinsic to the patient end up affecting clinical time.

Regarding the silicone palatal barrier, it is already known that it allows the professional to reproduce the anatomy of the palatal shell in a more detailed and predictable way when compared to the free hand technique.

In addition, it is through this that the first layer of enamel composite is positioned and light cured, forming the base that will facilitate the deposition of the other layers of composite, which allows higher quality and reproduction of the esthetic proportions in all the following stages of the layering. All these advantages will culminate in the reduction of clinical time, as there will be less difficulty in finishing and polishing, as well as in occlusal adjustment.

The transparent silicone guide makes it possible to predict what the finished restoration will be like, making it easier to identify and carry out all the steps that precede the restoration itself. For example, the amount of tooth wear and the thickness of the dentin layer stand out. Another point to be highlighted is the possibility of more accurately copying the buccal and interproximal anatomy defined at the time of waxing, reducing the technical complexity that would if the professional chose to define these details at the time of the restoration. Besides, it is possible to define the amount of buccal enamel composite with appropriate proportions, as the surplus is overflowed through the hole made in the guide and can be easily removed with immediate finishing. (Felippe et al., 2005).

In synergy, it is possible to state that these two techniques are able to significantly reduce the clinical time spent by the operator during the restorative procedure, and present satisfactory esthetic and functional results. The ability that the proposed association has to reproduce the anatomy, foreseen in the wax-up, makes the finishing and final polishing faster and more intuitive, allowing an occlusal adjustment without major difficulties.

CONCLUSION

From the clinical case presented and the literature consulted, it can be concluded that the technical presentation constitutes an important resource for cases of high anterior esthetic demand, since it increases the predictability of the results of direct restorations and decreases the clinical time and the need for operator's manual skills.

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