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Management of Black Triangle by composit restoration : A Clinical Case Report

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Abstract

An adequate smile is dictated by the harmony and symmetry of the gingival biotype, lips outline, and dental crown shape. However, the loss of the interdental papilla leads to the appearance of a black triangle at the gingival base. This observation concerns a 55-year-old patient presenting multiple "black triangles" in the anterior-superior area, causing aesthetic concerns. The use of a specific matrix, the application of the fifth-generation adhesive MR2 system, alongside enamel and dentin nano-hybrid composites, allowed us to limit the requested interproximal shapes, ensure effective composite bonding, mimic the state of natural teeth, and mask the black triangles for the patient. Considering ethics, the adhesive restorative technique will be the most cost-effective therapeutic choice. In line with the therapeutic gradient, this minimally invasive technique should be the primary approach for cases involving "black triangles."

Keywords : aesthetic, black triangle, dental composite, interproximal area, operative dentistry

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I.Introduction

According to the Tarnow rule, disappearance of interdental papilla associated with a vertical distance bony crest - contact point exceeding 6 mm diagnoses the presence of a black triangle [1]. The base of black triangles located at gingival base. Also called open gingival embrasure, this gingival biotype defect promotes premature aging of the smile, causes functional discomfort, and undermines the periodontal health of the patient. Frequently found in multiple locations, this pathology represents a complex aesthetic and functional issue. Its etiology is multifactorial. Periodontal origine due to bone loss, orthodontic treatment complication, or related to the root morphology (divergence greater than 3.65°), related to crown morphology (triangular dental morphology) [2]. According to a study by Ko-Kimura et al. in 2018, cases of black triangles were observed in 66.7% of individuals over 20 years old [3]. Swasson KK in 2018, conducted a study about black triangle in Washington. They reported that 40% of orthodontically treatment induced black triangles [4]. This condition is also frequently diagnosed in individuals with triangular dental morphology. Where a more incisal contact point position is unfavorable for maintaining the interdental papilla [5]. Depending on the degree of involvement, Nordland and Tarnow classified them into four classes from I to III. In normal case, interdental papilla fills the gingival embrasure. In Class I, the type of the interdental papilla is located between the contact point and the most coronal extent of the interproximal cemento-enamel junction (CEJ). In Class II, the crest of the papilla is at or apical to the interproximal (CEJ) but coronal to the facial CEJ. In Class III, the crest of the papilla is at or apical to the facial CEJ [1]. Management options is interdisciplinary. It includes non-surgical approaches, such as additive composite restoration, proximal enamel reduction, or prosthetic treatmen. While surgical options involve interproximal bone grafting or gingival grafting. The overall objective of this work was to present a case of a black triangle managed by a non-surgical technique of additive composite restoration.

II.Observation

This is a 55-year-old man who presented to the odonto-stomatology department of the University Hospital Profesora Zafisaona Gabriela Androva Mahajanga due to aesthetic concerns. The patient's request is based on improving the aesthetics of the anterior-

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superior area. During the anamnesis, the patient did not show any general health problems. Endodontic treatment of a posterior tooth is on going. Upon extraoral examination, he displayed a gingival-type smile. In the intraoral examination, the patient's oral hygiene was average, and a triangular crown morphology was noted, with the presence of black triangles in the anterior-superior and inferior sectors. According to the Nordland and Tarnow's classification, Class II of black triangle was diagnosed in the anterior-superior area involving teeth 11, 12, 13, 14, 21, 22, and 23.

The etiology is due to the triangular morphology of the dental crown. The tip of the papilla is located at the enamel-cement junction, and the most apical point is situated at the labial surface. The vertical distance from the alveolar crest to the contact point of the black triangles was greater than 7.1 mm (Figure 1).

The contact points are located close to the incisal base. Gingival recessions have been observed. The therapeutic challenge focused on closing the gingival embrasures while considering the maintenance of periodontal health. The distal and mesial contours, the anatomical widths of the teeth, and the accuracy of the verticality of the contact points were all highlighted. As a means of management, the patient consented to a minimally invasive approach through additive composite restoration. The technique involves the re-anatomization of the dental crowns. Pre-treatment, a photograph was taken, which will serve for the chromatic study of the color of the tooth to be restored and the shade of composites to be used, as well as delineating the additive restoration (Figure 1).

In addition to the basic clinical examination setup in odonto-stomatology, the technical setup for the additive restoration was prepared in advance. A bonding system, specifically a fifth-generation MR2 adhesive system, was utilized (Figure 2). For the matrix system, a matrix with integrated curvature was employed (Figure 3). For finalizing the restoration, the finishing of the transition lines was achieved using a yellow-ring turbine bur (Figure 5). Polishing was performed using polishing discs with a diameter of 14 mm, in medium, fine, and superfine grits. The chosen operative protocol includes an etching step with 37% phosphoric acid, followed by rinsing and drying, application of the fifth-generation adhesive system, then photopolymerization, adjustment of the matrix system (gingival groove) (Figure4), combined composites placement according to the C-factor, and finishing and polishing of the restoration.

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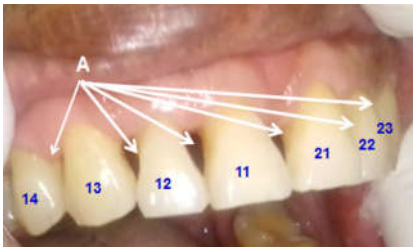

Figure 1: Patient's pre-restorative dental condition
(Buccal view)
In A: Black triangle [Rafalimino]

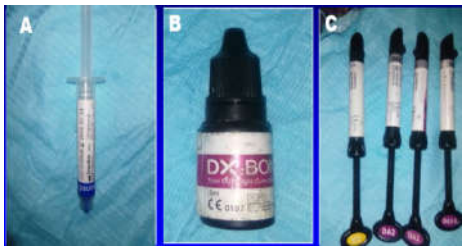

Figure 2: Technical platform used
In A: Etching
In B: Adhesive system
In C: Composites [Rafalimino]

Figure 3: Finishing accessories
A: Stamping system
B: Polishing system [Rafalimino]

Figure 4: Adjustment of the matrix system [Rafalimino]

Figure 5: Finishing the restoration [Rafalimino]

Figure 6: Polishing step [Rafalimino]

Figure 7: Initial case status of Black triangle [Rafalimino]

Figure 8: Post-therapeutic state [Rafalimino]

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III.Discussion

As a result, the additive composite management technique for the black triangles was non-aggressive to the hard dental tissues compared to indirect techniques, and our results corroborate those of authors such as : Swason KK and coll, who stated that it is the most conservative technique for this case [4]. Al-Khayatt AS and coll, said that resin composite restoration is a minimally invasive and less costly treatment option relative to a fixed option [6]. Composite restoration has a long-term survival rate and aesthetic benefit with the advantage of a straightforward maintenance visit such as minor repair or polishing of a chipped composite. According to Clark D, the same matrix used and its manipulation technique procured predictable and positively anatomical results [7]. Clarck DJ noted that the composites used, specifically the combination of flowable composites with condensable composites, created the perfect viscosity to fill the interproximal spaces [8].

Conclusion

According to the results, the aesthetic efficiency of the additive restorative technique using composite has been observed, and the stability and compatibility of the composite material associated with the matrix system ensure effective filling. Hence, the importance of prioritizing this therapeutic choice.

Conflicts of interests

We, the authors of this manuscript, declare no conflicts of interest regarding the publication of this article.

Patient consent

The patient has given full permission for the publication other use of his clinical case and photographs.

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