Aesthetic Revival: Direct Composite Rehabilitation of Anterior Teeth

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Abstract

Restoring anterior teeth affected by Class III, IV, and V carious lesions requires precise knowledge of aesthetic and periodontal factors to ensure functional and visually appealing outcomes. Composite resins are widely utilized due to their superior adhesion, conservative approach to tooth structure preservation, and excellent aesthetic potential. This case report discusses the clinical management of anterior composite restorations, focusing on material selection, bonding techniques, and aesthetic outcomes. Proper adhesion, shade matching, and finishing techniques were employed to achieve natural-looking, durable restorations. The results highlight the significance of composite resins in modern restorative dentistry, demonstrating their ability to enhance both function and aesthetics in anterior teeth.

Key words: *Aesthetic restoration, Direct composite resin, Restorative dentistry*

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Introduction

The aesthetic aspect has always been important for individuals, as modern society places significant emphasis on facial aesthetics, which is essential for social integration.[1] Dental aesthetics plays a crucial role in this, as symmetry, visibility, proportion, and color contribute to a harmonious smile.[2] Tooth substance loss in the anterior region, caused by caries or trauma, impacts both function and appearance, while lateral dental destructions affect overall health.[3] Due to the rising demand for aesthetic dental treatments, new materials have emerged, promoting minimally invasive approaches for anterior aesthetic restorations in a single visit.[4]

Case report

A 28-year-old male patient presented with a chief complaint of sensitivity in both upper and lower anterior regions In the Department of Conservative Dentistry and Endodontics at Narsinhbhai Patel Dental College and Hospital, Visnagar. Upon intraoral examination, extensive dental caries was observed: Class 3 caries involving teeth 11, 12, 13, 21, 22, 23, 31, 32, 33, 41, and 42, Class 4 caries affecting teeth 11 and 21, and Class 5 caries on teeth 13, 22, 23, 32, 33, 43, and 45. Patient was made aware about yellowish discoloration and suitable treatment options for the same were given. However, he opted not to proceed with treatment for the discoloration. The patient had no

significant medical history, facilitating a focused approach to dental management.

Fig 1: Preoperative photograph

Following patient consent, a minimally invasive and cost-effective treatment plan was devised, opting for direct composite restorations to be completed in a single visit. The button technique was employed for color determination, ensuring aesthetic harmony with the patient's dentition. The chosen restorative material, 3M ESPE Filtek Z250 XT nanohybrid composite, was selected for its proven durability and aesthetic properties.

Treatment commenced with meticulous caries excavation and enamel beveling to enhance adhesive bonding. For teeth exhibiting proximity to the pulp, an indirect pulp capping procedure was performed using a calcium hydroxide liner (Cal LC - PrevestDenPro), followed by application of a glass ionomer cement (Shofu FX Ultra Bulk Fill) as a protective base.

Subsequent to etching the enamel with 37% orthophosphoric acid and thorough rinsing and drying, a self-etch adhesive (3M ESPE Single Bond Universal) was applied as per manufacturer instructions. The nanohybrid composite was then incrementally layered and polymerized using a LED curing light (Woodpecker LED D curing light), ensuring adequate conversion of the resin and bond strength.

To prevent the formation of an oxygen inhibition layer, glycerine gel was applied prior to final polymerization. The restorations were meticulously contoured and finished using polishing discs (3M ESPE Sof-LexTM, USA), achieving a smooth and natural surface texture.

Fig 2: Postoperative photograph

This comprehensive approach not only addressed the patient's immediate concern of sensitivity but also restored function and aesthetics effectively. Post-operative care instructions were provided to ensure long-term success of the restorations, highlighting oral hygiene maintenance and regular follow-up appointments.

Composite restoration provides an effective and economical solution for restoring esthetic regions of the dentition. Advancements in bonding technology, along with the development of nano-composite materials, have significantly enhanced the longevity and overall performance of composite restorations, particularly in challenging clinical scenarios.[5] The continuous improvements in optical properties, including color stability, as well as physical attributes of direct composite materials, have made single-visit direct composite restorations a preferred treatment modality in this study. One of the key advantages of direct composite restorations is their efficiency, allowing the entire restorative procedure to be completed within a short duration.[6]

Traditionally, one-shaded restorative materials have been claimed to exhibit different optical behaviors compared to conventional group-shaded composites. To

ensure better color matching, the button try-in method was utilized in this case, as it has been observed to provide superior results compared to the VITA shade guide. The VITA shade guide, although commonly used, is primarily designed for ceramic restorations rather than composite materials, as ceramics undergo a different polymerization process. Additionally, the use of the VITA shade guide can pose a risk of cross-infection, which further necessitates alternative methods for shade selection.[7] In cases where accurate shade matching is critical, taking images in black and white format proves to be beneficial. The black and white image aids in assessing the value of the shade more effectively. While an untrained observer may perceive tooth color as simply white or yellow, the human eye is more adept at detecting value differences in a dental restoration rather than variations in hue or chroma. Among the three dimensions of color—hue, chroma, and value—value is the only one that exists independently. For instance, in a black and white photograph, only the value of a color can be distinguished, while hue and chroma remain indistinguishable.[8]

A two-step beveled approach was adopted for the composite restorations in this case report to enhance bonding effectiveness and aesthetic blending. The first bevel was relatively steep and measured approximately 2mm in width, which facilitated adequate exposure of enamel rods, thereby ensuring a more durable bond. The second bevel was more superficial, allowing for a seamless transition and improved shade integration with the adjacent tooth structure.[9] The selection of appropriate composite shades played a crucial role in achieving a natural appearance. High-value shades were strategically used to replicate enamel, while more chromatic shades were employed to restore the middle and cervical thirds of the crown, where increased chromaticity was necessary.[9]

To achieve optimal anatomical form and contour, a three-increment layering technique was implemented. The first and second increments were carefully shaped to recreate the mesial and distal line angles, providing a natural emergence profile. The third increment, being flatter, was utilized to fill the remaining space between the line angles, where grooves and other anatomical structures were meticulously sculpted to enhance the final aesthetic outcome.[5] This layering approach not only improved the visual appeal of the restoration but also contributed to its mechanical integrity and long-term durability.

The selection of composite material is a critical factor in achieving predictable aesthetic and functional results. In this case report, a nanofill-based composite material was chosen due to its superior aesthetic properties and excellent mechanical performance. Nanofill composites have been shown to provide enhanced polishability, improved color stability, and greater translucency compared to traditional microhybrid composites. Additionally, microhybrid composites are more prone to color degradation and opacity loss over time, making them less ideal for anterior restorations where aesthetics is a primary concern. Nanofill composites have also demonstrated superior bond strength in multiple studies, further reinforcing their suitability for long-lasting restorations. Given these advantages, the decision to use a nanofill-based composite material was justified to ensure a high-quality and aesthetically pleasing outcome in the presented case.[5]

In summary, advancements in composite materials and bonding techniques have significantly improved the outcomes of direct anterior restorations. The selection of an appropriate shade-matching method, the implementation of a strategic beveling approach, and the use of an effective layering technique are all crucial in achieving natural and long-lasting

restorations. The case highlights the importance of meticulous treatment planning and material selection to optimize both esthetic and functional results in composite restorations of Class III, IV, and V carious lesions.

Conclusion

Resin composites have become the preferred choice in modern dentistry, allowing for the resolution of esthetic and functional concerns that once required indirect restorations. With advancements in material science, these composites now exhibit superior bonding strength, enhanced mechanical properties, and exceptional esthetic qualities. Their ability to accurately replicate natural tooth characteristics, such as color, shade, and saturation, makes them invaluable for restorative procedures.

Additionally, resin composites can effectively mimic the opacity and translucency of teeth, particularly in crucial areas like the incisal edges. This ensures seamless integration with natural dentition, resulting in an aesthetically pleasing smile. The continued evolution of composite materials has greatly expanded their clinical applications, making them an essential component in modern restorative and cosmetic dentistry.

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