

Case Report

Cosmetic Management of Midline Diastema Using Direct Composite Resin: A Case Report

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ABSTRACT:

A midline diastema, characterized by a space between the maxillary central incisors, is a common aesthetic concern with various potential causes. These causes include abnormal labial frenulum positioning, small or peg-shaped teeth, missing teeth, extra teeth such as mesiodens, cysts, harmful oral habits, dental anomalies, genetic factors, anterior tooth protrusion, skeletal discrepancies, and incomplete fusion of the interdental bone. Among the numerous treatment options, direct composite resin has emerged as a conservative, adaptable, and minimally invasive solution.

A visible midline gap is often perceived as a cosmetic issue, akin to malaligned or protruding teeth. Studies suggest that such diastemas may negatively affect social perceptions, leading to judgments regarding an individual's intelligence or social competence. Treatment strategies depend on the underlying cause and may include orthodontic therapy, restorative procedures, surgical correction, or a multidisciplinary approach. For cases involving a mismatch in tooth size, restorative treatments are particularly effective. Direct composite resin restorations offer numerous benefits over alternatives like ceramic veneers and orthodontics. These include time efficiency, as the procedure can typically be completed in a single visit without the need for preliminary models or wax-ups, as well as cost-effectiveness due to the absence of laboratory fees. Furthermore, composite restorations are less abrasive on opposing teeth than ceramic options.

This case report highlights the successful application of direct composite resin in closing a midline diastema, showcasing both the clinical approach and the practical advantages of this treatment method.

Keywords: spacing between teeth, aesthetic, middle diastma

INTRODUCTION:

A midline diastema refers to a space between the central incisors in the upper jaw.¹ The frequency of such gaps can vary widely depending on age and ethnicity. These spaces are often a normal part of dental development in children and typically close as the permanent canines come in.^{1,2,3} In adults, diastemas are usually caused by discrepancies in tooth size or a situation where there is an increased vertical distance between the upper and lower front teeth when the mouth is closed.⁴ Other less common causes include the angle of the incisors, overall spacing issues, the inclination of the teeth, the presence of frenums, and certain pathological conditions.^{2,3,5}

For many patients, a midline diastema is considered an aesthetic issue, similar to crowded or protruding incisors. Research has shown that individuals with noticeable diastemas are often viewed as less socially successful and less intelligent.^{4,5} Treatment options for diastemas include orthodontics, restorative procedures, surgical interventions, or a combination of these methods, depending on the cause.^{1,3} Diastemas caused by tooth-size discrepancies are often best treated with restorative solutions.⁴ These can involve various techniques such as direct composite veneers, indirect composite veneers, porcelain veneers, all-ceramic crowns, metal-ceramic crowns, or composite crowns.^{4,5}



Figure 1: perspective view of a patient who presented with a diastema between teeth #8 and #9

Diastemas, or spaces between teeth, can be addressed using several restorative techniques. These options include direct Composite Veneers, indirect Composite Veneers, porcelain Laminate Veneers, all-Ceramic Crowns, metal-Ceramic Crowns and Composite Crowns.^{4,6}

With growing patient demand for less invasive

aesthetic solutions and advancements in composite materials, direct composite bonding has become a popular choice for closing midline diastemas.^{7,8} This method is valued for its aesthetic benefits and enhanced material properties.^{7,8}

The case report describes the successful closure of a midline diastema through the use of a direct composite resin restoration. This method included layering the composite material to achieve a smooth, natural look

case presentation:

A 35-year-old female visited the Zawia Dental school Zawia, Libya, expressing concern about the spacing between her upper front teeth. Her medical history was unremarkable, and an intraoral examination identified a 2.5mm midline diastema in the maxillary arch, specifically between teeth 11 and 21. The patient noted that she had experienced spacing issues in her permanent dentition since its eruption, which affected her confidence when smiling. As a result, she sought aesthetic treatment to close the gaps, as they had a significant impact on her self-esteem

Procedure:

1. **Shade Selection:** Shades were determined using the Meta Biomed Nexcomp Composite (4g), with test applications of A2, A3, and A3.5 composites to verify the match. Ultimately, A2 and A3 were selected for the final restoration
2. **Isolation and Preparation:** The maxillary anterior teeth were isolated with a rubber dam and held back using dental floss. A window preparation was created on the labial surfaces of both central incisors.
3. **Bonding and Composite Application:** The tooth surfaces were treated with 37% phosphoric acid for 15 seconds, then rinsed and air-dried. A bonding agent (Meta P and Bond) was applied and cured for 20 seconds. An A3 shade composite served as the base layer, topped with an A2 shade as the final layer
4. **Finishing:** The restoration was shaped using a red banded diamond bur and checked for any high spots. The final look was improved by polishing with low-speed handpiece discs

Postoperative Outcome: The diastema was successfully closed with the direct composite restoration.



Figure 2: The enamel surfaces of teeth #8 and #9 were



Figure 3: Two increments of composite resin are applied to the diastema at the same time and shaped for optimal proportion on the mesial surfaces

DISCUSSION:

Closing a midline diastema with direct composite resin is a commonly used technique in dental practices today. However, for cases involving large gaps or significantly misaligned teeth, a straightforward composite closure may not always provide optimal results.⁹ Direct composite restorations offer several benefits compared to alternatives like ceramic veneers and orthodontics. They can usually be completed in one visit without the need for preliminary models or wax-ups, making them more time-efficient. Furthermore, they are more cost-effective as they eliminate laboratory fees. Additionally, composite restorations tend to be less abrasive to opposing teeth than ceramic options.¹⁰ While composite resin effectively addresses issues related to tooth structure, it may not completely resolve concerns with gingival architecture, such as the development of unwanted black triangles between

teeth. Recent advancements in composite materials have enhanced their physical and aesthetic properties, making them suitable for high-quality, durable restorations that require minimal or no tooth preparation compared to ceramics.^{4,6,11,13}

Despite these advantages, composite resins do have some limitations when compared to indirect porcelain alternatives. They may not be the best choice for teeth that experience high occlusal forces, as they possess lower fracture toughness, shear strength, and compressive strength.^{14,15} The longevity of composite restorations can also be compromised by parafunctional habits, such as bruxism or nail-biting.¹⁵ Additionally, composites may not maintain their color stability as well as glazed ceramics, though regular polishing and follow-up visits can help manage staining.^{15,16}

This case report details a two-year follow-up on the closure of a midline diastema using direct composite resin restoration. Traditionally, a silicone matrix is utilized to guide the restoration, typically following a wax-up on a cast model. However, this report introduces an alternative method that eliminates the need for a silicone matrix. Instead, the mesial surfaces of the central incisors were restored individually using a transparent matrix band to establish a foundation for the restoration. The layering technique was employed in a manner similar to that used with a silicone matrix.¹⁷

Restoring the diastema without a guide requires significant skill and experience from the dentist. Although this method can achieve a natural appearance, it is more challenging than using a matrix. The results from the six-month and two-years follow-ups showed that the restorations remained intact, with no visible fractures or lines of demarcation. However, longer follow-ups are necessary to fully assess the durability of the restoration. Potential issues within six months can include staining, chipping, detachment, or fluid seepage.

Taking these factors into account, a skilled dentist who carefully chooses cases and employs the right techniques and modern materials can achieve aesthetically pleasing and durable results with direct composite resin restorations.

CONCLUSION:

Closing a midline diastema with direct composite resin restoration offers a cost-effective and minimally invasive treatment option. It is particularly

advantageous for patients concerned about financial constraints and the need for multiple dental visits. This technique is an excellent alternative for individuals with conditions such as dental fluorosis,

peg-shaped lateral incisors, or midline diastema, providing a more conservative solution compared to full crowns.

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