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## Interdental Papilla Adaptation Following Anterior Diastema Closure with Direct Composite Restorations: A Case Report

## Direkt Kompozit Restorasyonlarla Anterior Diastema Kapatımı Sonrası İnterdental Papilla Adaptasyonu: Olgu Sunumu

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### ABSTRACT

**Objectives:** Anterior diastemas are common esthetic problems that may negatively affect smile appearance and patient self-perception. Although various treatment options exist, direct composite restorations are increasingly preferred for diastema closure due to their conservative and minimally invasive nature. This case report presents the clinical relevance of biologically guided restorative design in preventing black triangle formation and supporting interdental papilla adaptation following anterior diastema closure.

**Case report:** A 35-year-old systemically healthy woman presented with esthetic concerns related to a midline diastema between the maxillary central incisors. Clinical examination revealed an approximately 4.0 mm diastema, while radiographic evaluation showed physiologic alveolar bone levels without periodontal or periapical pathology. Based on the patient's esthetic expectations and preference for a conservative, single-visit approach, diastema closure was performed using direct resin composite restorations. Particular attention was paid to contact point positioning, proximal surface contouring, and emergence profile design, aided by a transparent Mylar strip for controlled formation of the proximal contact area. At the one-month follow-up, complete interdental papilla fill was observed with healthy gingival tissues and satisfactory marginal adaptation. At six months, the restorations maintained esthetic and functional integrity, with stable gingival tissues and no evidence of discoloration, proximal contact loss, black triangle formation, or complications.

**Conclusion:** With appropriate case selection and biologically guided restorative design, direct resin composite restorations represent an effective and conservative option for anterior diastema closure. Proper contact point positioning and anatomically driven proximal contouring play a critical role in preventing black triangle formation and promoting stable interdental papilla adaptation.

**Keywords:** Composite resins, Dental esthetics, Dental papilla, Diastema

### ÖZET

**Amaç:** Anterior diastemalar, gülüş estetiğini ve hastaların öz algısını olumsuz etkileyebilen yaygın estetik problemlerdir. Farklı tedavi seçenekleri tanımlanmış olmakla birlikte, direkt kompozit restorasyonlarla diastema kapatılması konservatif yaklaşımı nedeniyle giderek daha fazla tercih edilmektedir. Bu olgu raporu, anterior diastema kapatımı sonrası siyah üçgen oluşumunun önlenmesi ve interdental papillanın adaptasyonunun desteklenmesinde biyolojik temelli restoratif tasarımın rolünü klinik olarak değerlendirmektedir.

**Olgu sunumu:** Sistemik olarak sağlıklı 35 yaşında kadın hasta, maksiller santral kesici dişler arasındaki orta hat diastemasına bağlı estetik şikâyet ile başvurmuştur. Klinik muayenede yaklaşık 4,0 mm genişliğinde diastema saptanmış, radyografik değerlendirmede periodontal veya periapikal patoloji olmaksızın fizyolojik alveolar kemik seviyeleri izlenmiştir. Hastanın estetik beklentileri ve konservatif, tek seanslık tedavi tercihi doğrultusunda direkt rezin kompozit restorasyonlarla diastema kapatımı planlanmıştır. Restorasyon sırasında kontak noktası konumlandırılmasına, proksimal yüzey konturlarına ve çıkış profilinin biyolojik prensiplere uygun tasarlanmasına özel önem verilmiş; proksimal kontak alanının kontrollü oluşturulabilmesi için şeffaf Mylar strip kullanılmıştır. Bir aylık kontrolde diastema bölgesinin interdental papilla ile dolduğu, gingival dokuların sağlıklı olduğu ve marjinal adaptasyonun yeterli olduğu gözlenmiştir. Altı aylık takipte restorasyonların estetik ve fonksiyonel bütünlüğünü koruduğu, gingival dokuların stabil olduğu ve kontak kaybı, renklenme, siyah üçgen oluşumu veya başka bir komplikasyon izlenmediği belirlenmiştir.

**Sonuç:** Uygun olgu seçimi ve biyolojik olarak yönlendirilmiş restoratif tasarım ile direkt rezin kompozit restorasyonlar, anterior diastema kapatımında etkili ve konservatif bir tedavi seçeneği sunmaktadır. Doğru kontak noktası konumlandırılması ve anatomik olarak yönlendirilmiş proksimal konturlama, siyah üçgen oluşumunun önlenmesi ve interdental papillanın adaptasyonunun stabil şekilde sağlanmasında kritik rol oynamaktadır.

**Anahtar Kelimeler:** Dental estetik, Dental papilla, Diastema, Kompozit rezinler

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## Introduction

Anterior diastemas, particularly the spaces between the maxillary incisors, represent a significant esthetic concern that directly affects smile esthetics and patients' self-perception.<sup>1</sup> Diastemas may lead to disturbances in facial symmetry, resulting in a smile appearance that may be perceived as less attractive by both patients and clinicians.<sup>2</sup> Consequently, the demand for diastema closure treatments has increased in recent years, with patients frequently favoring conservative approaches such as direct restorative procedures.

In the management of diastemas, direct composite resins offer a minimally invasive and cost-effective treatment alternative.<sup>3</sup> Direct composite restorations can be performed in a single clinical session, thereby preserving tooth structure to a great extent while reducing both treatment time and cost.<sup>4</sup> Moreover, with the use of contemporary composite materials exhibiting high esthetic properties, it is possible to closely mimic the natural tooth form and color during diastema closure.<sup>3</sup> From this perspective, direct composite restorations allow the achievement of a natural smile esthetics within a short treatment time and stand out as a less invasive treatment option compared with orthodontic therapy or porcelain restorations.<sup>4</sup>

During diastema closure using resin composites, one of the most common clinical challenges is the occurrence of gingival level black triangles or open embrasure spaces.<sup>5</sup> These black triangles not only compromise smile esthetics but may also predispose to periodontal problems by facilitating food impaction.<sup>6</sup>

The vertical distance from the contact point to the alveolar bone crest is considered the key determinant of interdental papilla presence.<sup>7</sup> In a previous study, it was reported that when the distance between the contact point and the alveolar crest was 5.0 mm or less, the interdental papilla was preserved in 98% of cases; however, this rate decreased to 56% at a distance of 6.0 mm and to 27% at 7.0 mm.<sup>8</sup> Increased interproximal spacing and root divergence compromise papillary support, making complete papilla fill difficult in excessively wide interproximal

spaces.<sup>9</sup> When these factors are considered collectively, it becomes evident that effective diastema closure and favorable interdental papilla adaptation require careful consideration of contact point positioning, tooth morphology, and periodontal health.<sup>10</sup> This case report presents a restorative approach demonstrating that satisfactory interdental papilla adaptation can be achieved following diastema closure.

## Case Report

A 35-year-old systemically healthy woman presented with esthetic concerns associated with a diastema between the maxillary anterior teeth. On clinical examination, an approximately 4.0 mm midline diastema was identified between the maxillary central incisors (Figure 1). Clinical evaluation revealed no pathological labial frenulum attachment, and the maxillary central incisors exhibited favorable axial inclinations without signs of root divergence. The diastema was therefore considered primarily esthetic rather than related to frenal or orthodontic factors. Interdental papilla fill was clinically assessed using the Papilla Presence Index (PPI) proposed by Cardaropoli, Re, and Corrente (2004), which evaluates the presence of the interdental papilla based on embrasure fill.<sup>11</sup> At baseline, prior to restorative intervention, the interdental papilla between the maxillary central incisors was absent, corresponding to a PPI score of 3.



**Figure 1.** Preoperative intraoral view showing the midline diastema between the maxillary central incisors.

Radiographs showed physiologic alveolar bone levels in the affected region, with no signs of periapical or periodontal pathology. Periodontal examination revealed healthy gingival tissues, with probing depths  $\leq 2$  mm, absence of bleeding

on probing, and no clinical signs of periodontal disease. Plaque control was assessed as adequate. Horizontal measurement of the diastema width was performed using a periodontal probe (UNC-15, Hu-Friedy, USA). According to the patient's history, a direct resin composite restoration had previously been placed in the same region; however, this restoration subsequently fractured (Figure 2).



**Figure 2.** Intraoral view demonstrating the fractured direct resin composite restoration previously placed in the diastema region.

Considering the patient's esthetic expectations, desire for a short treatment duration, and preference for a conservative approach, diastema closure with a direct resin composite restoration was planned. Written informed consent was obtained from the patient, and permission was granted for the use of clinical and photographic data for scientific purposes. To ensure adequate moisture control throughout the restorative procedures, the treatment area was isolated using a rubber dam (Sanctuary® Dental Dam, Sanctuary Health, Malaysia) (Figure 3a). The fractured existing composite restoration was carefully removed using low-speed diamond burs without causing damage to the surrounding tissues (Figure 3b).



**Figure 3. a.** Isolation of the operative field using a rubber dam prior to restorative procedures **b.** Careful removal of the fractured composite restoration using low-speed diamond burs without damaging the surrounding tooth structure

Prior to the restoration, a 37% orthophosphoric acid etching gel (Etch-Rite, Pulpdent Corporation, USA) was applied to the relevant tooth surfaces for 30 seconds (Figure 4a).

Following the acid-etching procedure, the surfaces were rinsed with water for 20 seconds and gently air-dried. Subsequently, the Prime&Bond Universal adhesive system (Dentsply Sirona, USA) was applied to the enamel surfaces using a micro-applicator (Figure 4b) and was light-cured for 20 seconds using an LED curing unit (Bluephase G2, Ivoclar Vivadent, Liechtenstein). Polymerization was performed using a light intensity of 1200 mW/cm<sup>2</sup>.



**Figure 4. a.** Application of 37% orthophosphoric acid etching gel to the enamel surfaces of the maxillary central incisors **b.** Application of the universal adhesive system to the etched enamel surfaces prior to light polymerization.

Following completion of the adhesion protocol, the restorative phase was initiated. For diastema closure, a nanohybrid resin composite material (Estelite Asteria, Tokuyama Dental, Japan) in shade A1B was selected. To enhance surface adaptation of the composite material and allow controlled formation of the anatomical contours, a sable brush lightly moistened with GC Modeling Liquid (GC Corp., Tokyo, Japan) was used.

To allow proper shaping of the proximal contact area and the interdental papilla region, a proximal wall was established using a transparent Mylar strip (Hawe Transparent Matrix Strip, Hawe Neos Dental, Switzerland). The composite material was applied using an incremental technique, and each layer was light-cured with an LED curing unit. Initially, the proximal contact area was established in the gingival region, followed by shaping of the labial surface morphology and tooth contours in accordance with natural tooth anatomy. The same restorative

protocol was applied to the contralateral maxillary central incisor to achieve symmetry. After completion of the restorations, the rubber dam was removed and occlusal contacts were checked using articulating paper. Following the necessary occlusal adjustments, finishing and polishing procedures were performed. Finishing procedures were carried out using fine-grit Sof-Lex™ discs (3M ESPE, St. Paul, MN, USA). Final polishing was completed with Diacomp Plus Twist polishing rubbers (EVE Ernst Vetter GmbH, Germany) to reduce surface roughness and achieve a high surface gloss.

At the end of the treatment, the diastema between the maxillary central incisors was successfully closed, achieving satisfactory esthetic and functional emergence profile (Figure 5). Immediate postoperative evaluation of the restorations according to modified USPHS criteria revealed Alpha ratings for color match, marginal adaptation, and anatomic form. The clinical evaluation was performed using selected core criteria of the modified United States Public Health Service (USPHS) system, including color match, marginal adaptation, anatomic form, and secondary caries. The original USPHS framework described by Cvar and Ryge has been widely adopted and selectively modified in clinical restorative research.<sup>12,13</sup> The selective use of these core criteria reflects the short-term follow-up period and the clinical nature of the present case report.



**Figure 5.** Immediate postoperative intraoral view demonstrating successful closure of the anterior diastema with satisfactory esthetic and functional outcome.

The proximal contact areas and labial contours of the restorations were found to be harmonious with natural tooth morphology. At the one-month clinical follow-up, the diastema region was observed to be filled by the interdental papilla, with healthy gingival tissues and maintained marginal adaptation of the restorations (Figure 6). This finding corresponded to a Papilla Presence Index (PPI) score of 1, indicating complete papilla presence with full embrasure fill and favorable soft tissue adaptation. At the one-month follow-up, the restorations were reassessed using modified USPHS criteria, and all evaluated parameters were rated as Alpha.



**Figure 6.** One-month follow-up intraoral view showing favorable interdental papilla fill and healthy gingival tissues in the diastema region.

At the six-month follow-up examination, the restorations maintained their esthetic and functional integrity, the gingival tissues remained stable, and no proximal contact loss or other complications were observed (Figures 7, 8). According to modified USPHS criteria, all assessed parameters remained at Alpha scores at the six-month follow-up. No secondary caries was observed during the 6-month follow-up period; however, this finding represents early clinical outcomes and should be interpreted accordingly. USPHS evaluation results at different follow-up periods are presented in Table 1.

**Table 1.** Clinical evaluation of the restorations at different follow-up periods according to modified USPHS criteria.

USPHS criterion	Immediate	1 month	6 months
Color match	Alpha	Alpha	Alpha
Marginal adaptation	Alpha	Alpha	Alpha
Anatomic form	Alpha	Alpha	Alpha
Secondary caries	Alpha	Alpha	Alpha

USPHS: United States Public Health Service criteria. Alpha indicates ideal clinical performance

At this time point, the interdental papilla remained stable with complete embrasure fill, corresponding to a Papilla Presence Index (PPI) score of 1 according to Cardaropoli et al.<sup>11</sup>, demonstrating maintained favorable papilla adaptation over time. The Papilla Presence Index scores at baseline and follow-up time points are summarized in Table 2.

**Table 2.** Interdental papilla evaluation using the Papilla Presence Index (PPI) proposed by Cardaropoli et al.<sup>11</sup>

Time point	PPI score
Baseline	3
Immediate	3
1 month	1
6 months	1

PPI: Papilla Presence Index according to Cardaropoli et al.<sup>11</sup>

**Figure 7.** Six-month follow-up intraoral view illustrating stable proximal contact areas and maintained gingival health without black triangle formation**Figure 8.** Six-month follow-up close up view demonstrating preserved marginal adaptation, surface integrity, and harmonious soft tissue contours.

Throughout the follow-up period, no discoloration, marginal discrepancy, or signs of gingival inflammation were observed. The patient reported satisfaction with the esthetic and functional outcome.

### Discussion

Various treatment approaches have been described for the esthetic rehabilitation of anterior diastemas. Although orthodontic

treatments and indirect ceramic restorations can provide predictable esthetic and functional outcomes, factors such as prolonged treatment duration, higher cost, and increased invasiveness may limit their acceptance by all patients in clinical practice.<sup>4</sup> In the present case, orthodontic treatment was not preferred due to the absence of underlying orthodontic indications, such as unfavorable axial inclinations or pathological

frenulum attachment, as well as the patient's desire for a shorter treatment duration. Indirect ceramic restorations were also not selected because of their more invasive nature and the requirement for irreversible tooth preparation. Considering the patient's esthetic expectations and preference for a conservative, single-visit approach, direct resin composite restorations were chosen as the most appropriate treatment option. Therefore, in recent years, direct resin composite restorations have gained prominence due to their minimally invasive nature and ability to provide esthetic results within a short treatment time. In the present case, direct resin composite restorations were preferred for anterior diastema closure based on similar clinical considerations.

The literature reports that in cases where composite restorations fail or do not meet patient expectations, minimally thick ceramic veneers may be considered as a subsequent treatment option.<sup>14-16</sup> This supports the concept that direct composite restorations can be positioned as a conservative first step within a stepwise treatment planning approach for esthetic rehabilitation. One of the most frequently reported complications in diastema closure is the formation of open embrasure spaces at the gingival level.<sup>17</sup> These spaces, referred to as 'black triangles,' not only compromise esthetics but also pose a risk to periodontal tissues by increasing plaque retention.<sup>6</sup> It has long been recognized that the presence of the interdental papilla is closely related to the vertical distance between the contact point and the alveolar bone crest.<sup>8</sup> Tarnow et al.<sup>8</sup> reported that when this distance is 5 mm or less, the interdental papilla is largely preserved, whereas papilla presence decreases significantly as the distance increases. Repositioning of the proximal contact area during restorative treatment played a key role in supporting interdental papilla adaptation and stability, rather than inducing active soft tissue adaptation. In the present case, interdental papilla adaptation was evaluated using the Papilla Presence Index (PPI) proposed by Cardaropoli et al.<sup>11</sup>, allowing standardized assessment of soft tissue changes following restorative treatment. However, interdental papilla formation is not determined solely by the vertical distance.

Horizontal interproximal spacing, root positioning, and proximal surface morphology also play a decisive role in papilla stability.<sup>18</sup> Wide interproximal spaces and excessively convex proximal contours may restrict the biological space required for the interdental papilla, leading to unfavorable gingival outcomes.<sup>19</sup> According to these approaches, the contact point, cemento-enamel junction, alveolar bone level, and proximal surface contours should be evaluated collectively.<sup>20</sup> Although attempting to mechanically eliminate black triangles by means of overcontoured restorations may provide short-term esthetic improvement, it can adversely affect periodontal health in the long term.<sup>21</sup> Therefore, during diastema closure, the gingival-occlusal contouring of the proximal surfaces is of critical importance, in addition to the positioning of the contact area. In this case, careful attention was given to shaping the emergence profile in accordance with anatomical principles, taking into account the biological requirements of the interdental papilla and surrounding soft tissues.

In direct composite restorations, controlled formation of the proximal contact area using transparent matrix systems contributes to preservation of an appropriate space for the interdental papilla.<sup>3</sup> In restorations performed using a freehand technique, deliberate limitation of the restorative material in the gingival region and design of the proximal surfaces with a slightly flat or concave morphology, in combination with the use of a transparent Mylar strip, provide a clinically controllable and practical approach that supports physiological interdental papilla adaptation by preserving the biological space required for soft tissue fill. Accordingly, this method was preferred in the present case to allow controlled and predictable placement of the restoration in the gingival region. The esthetic properties of composite resins, enabled by a wide range of opacity and translucency options, allow for successful replication of natural tooth structure.<sup>22</sup> Nevertheless, it has been reported that long-term use of these materials may be associated with a reduction in surface gloss and changes in color stability.<sup>16</sup> However, these disadvantages can be readily

managed through regular clinical follow-ups and repolishing procedures when necessary. In the present case, sequential clinical evaluations performed immediately after treatment and at 1- and 6-month follow-up visits demonstrated consistent Alpha ratings according to modified USPHS criteria, indicating stable short-term esthetic and functional performance of the restorations. Nevertheless, the evaluation of secondary caries at 6 months reflects short-term clinical findings, and longer follow-up periods are required to draw definitive conclusions regarding caries development. Overall, when applied with appropriate case selection and biologically driven morphological design, direct resin composite restorations represent an effective and conservative treatment option for the esthetic rehabilitation of anterior diastemas. One of the limitations of this case report is the relatively short follow-up period of 6 months. Therefore, the findings should be interpreted as early clinical outcomes. Long-term prospective clinical studies are needed to evaluate secondary caries development, marginal stability, and soft tissue behavior over time.

### **Conclusion**

Direct composite restorations are considered a conservative treatment option for anterior diastema closure, allowing preservation of tooth structure. Within this approach, appropriate positioning of the contact area and anatomically driven shaping of the proximal surfaces are among the key factors that may contribute to preventing the formation of black triangle spaces. Planning the restorative design in harmony with the interdental papilla is essential to support optimal soft tissue adaptation. In the present case, favorable interdental papilla adaptation was achieved following anterior diastema closure without surgical or periodontal intervention, emphasizing the role of restorative design in soft tissue stability. Within the limitations of this case report and the short-term follow-up period, direct composite restorations with biologically guided restorative design appear to be a conservative and clinically acceptable option for anterior diastema closure.

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### **Ethical Approval**

Ethical approval is not necessary. An informed consent form is available.

### **Conflict of Interest**

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## References

1. Jee MJ, Kim YI, Kim SH, Kim SS, Park SB, Choi YK. Enhanced force systems for efficient maxillary anterior diastema closure using clear aligners: evaluation of attachments and enhanced structural modifications. *Appl Sci*. 2025;15(7):3672.
2. Zorlu M, Camcı H. The relationship between different levels of facial attractiveness and malocclusion perception: an eye tracking and survey study. *Prog Orthod*. 2023;24(1):29.
3. Korkut B, Yanikoglu F, Tagtekin D. Direct midline diastema closure with composite layering technique: a one-year follow-up. *Case Rep Dent*. 2016;2016:6810984.
4. Elkaffas AA, Alshehri A, Alqahtani AR, et al. Randomized clinical trial on direct composite and indirect ceramic laminate veneers in multiple diastema closure cases: two-year follow-up. *Materials*. 2024;17(14):3514.
5. Azzaldeen A, Muhamad AH. Diastema closure with direct composite: architectural gingival contouring. *J Adv Med Dent Sci Res*. 2015;3(1):134-9.
6. Barakat SO. Interdental papilla recession and reconstruction of the lost triangle: a review of the current literature. *Front Dent Med*. 2025;5:1537452.
7. Barakat O, Abbas M. Effect of different finishing and polishing systems on surface roughness and color changes of resin composites: an in vitro study. *Egypt Dent J*. 2019;65(1):657-66.
8. Tarnow DP, Magner AW, Fletcher P. The effect of the distance from the contact point to the crest of bone on the presence or absence of the interproximal dental papilla. *J Periodontol*. 1992;63(12):995-6.
9. Khaireddine H, Mohamed T, Arij R, Faten K, Faten BA. Factors impacting the height of the interproximal papilla: a cross-sectional study. *Clin Exp Dent Res*. 2023;9(3):449-54.
10. Haugen HJ, Marovic D, Par M, Khai Le Thieu M, Reseland JE, Johnsen GF. Bulk fill composites have similar performance to conventional dental composites. *Int J Mol Sci*. 2020;21(14):5136.
11. Cardaropoli D, Re S, Corrente G. The Papilla Presence Index (PPI): a new system to assess interproximal papillary levels. *Int J Periodontics Restorative Dent*. 2004;24(5):488-92.
12. Bayne SC, Schmalz G. Reprinting the classic article on USPHS evaluation methods for measuring the clinical performance of restorative materials. *J Esthet Restor Dent*. 2005;17(3):184-93.
13. Cvar JF, Ryge G. Criteria for the clinical evaluation of dental restorative materials. San Francisco: US Department of Health, Education, and Welfare, Public Health Service; 1971.
14. Barhoumi T, Riahi Z, Ayedi L. Esthetic management of maxillary midline diastema using porcelain laminate veneers: a case report. *Cureus*. 2025;17(9):e91586.
15. Viswambaran M, Londhe S, Kumar V. Conservative and esthetic management of diastema closure using porcelain laminate veneers. *Med J Armed Forces India*. 2015;71(Suppl 1):S581-5.
16. Moura JA, Souza GC, Silva RK, Durão MA. Direct veneers in composite resin or indirect veneers in ceramics: which is the best option? *Rev Assoc Paul Cir Dent*. 2022;76(1):56-61.
17. Kim YH, Cho YB. Diastema closure with direct composite: architectural gingival contouring. *J Korean Acad Conserv Dent*. 2011;36(6):515-20.
18. Chang LC. Factors associated with the interdental papilla height between two maxillary central incisors: a radiographic study. *J Periodontol*. 2012;83(1):43-9.
19. Zhang Y, Hong G, Zhang Y, Sasaki K, Wu H. Minimally invasive procedures for deficient interdental papillae: a review. *J Esthet Restor Dent*. 2020;32(5):463-71.
20. Mahale SA, Jagdhane VN. Anatomic variables affecting interdental papilla. *Journal of ICDRO*. 2013;5(1):14-8.
21. Lang NP, Kiel RA, Anderhalden K. Clinical and microbiological effects of subgingival restorations with overhanging or clinically perfect margins. *J Clin Periodontol*. 1983;10(6):563-78.
22. Varvara EB, Gasparik C, Ruiz-López J, Aghiorghiesei AI, Culic B, Dudea D. Color and translucency compatibility among various resin-based composites and layering strategies. *Dent J*. 2025;13(4):173.