



# Diastema Closure using Direct Composite restoration with layering technique: A case report

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## Abstract

Maxillary anterior spacing is a common aesthetic complaint of patient. Midline diastema or spacing in anterior teeth is a common condition that can present itself anytime to the dental office. It has been reported that maxilla has a higher prevalence of midline diastema than mandible. Midline diastema is multifactorial in etiology. Composite resin bonding to close diastema is a conservative and a relatively inexpensive means of enhancing individual smile and is often carried out as a single visit procedure. Direct composite resins in diastema closure cases allow dentist and patient complete control in formation of natural smile. This case report describes direct aesthetic midline diastema closure with composite layering technique. One bottle total etch adhesive was used and composite resin shades were layered on mesial surfaces of the teeth that were isolated with rubber dam and Teflon bands. Finishing and polishing procedures were achieved by using polishing discs. The closure of diastemas in the anterior zone to improve the patient's smile has been presented with direct composite resin restorations. The development of form, function, and esthetics with direct resin can be achieved with proper meticulous technique to provide the patient with a natural looking smile.

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### Introduction:

Midline diastema is defined as anterior midline spacing greater than 0.5 mm between the proximal surfaces of central incisors. Midline diastema or spacing in anterior teeth is a common condition that can present itself anytime to the dental office. It has been reported that maxilla has a higher prevalence of midline diastema than mandible. Midline diastema is multifactorial in etiology. Some of the causes include maxillary incisor proclination, labial frenum, incomplete coalescence of the interdental septum, pseudomicrodontia, presence of a mesiodens, peg-shaped lateral incisors, congenital absence of lateral incisors, pathologies (e.g., cysts in the midline region), habits such as finger sucking, tongue thrusting, and/or lip sucking, discrepancy in the dental and skeletal parameters, and probably genetics.<sup>(1)</sup>

Composite resin bonding to close diastema is a conservative and a relatively inexpensive means of enhancing individual smile and is often carried out as a single visit procedure in many dental practices. Direct composite resins in

diastema closure cases allow dentist and patient complete control in formation of natural smile.<sup>(2)</sup> Improved materials and techniques are often introduced leading professionals to endless improvement while fulfilling their patients' aesthetic demands. Recent aesthetic composite resin materials have similar physical and mechanical properties to that of the natural tooth and possess an appearance like natural dentin and enamel. They offer an expanded range of shades and varying opacities designed specifically for layering technique whereas early brands of composite resins offered only "body" shades and appeared dull and dense.<sup>(3,4)</sup>

This case report describes direct aesthetic midline diastema closure with composite layering technique.

### Case Report:

A 27-year-old female patient reported to the Department of Conservative Dentistry and Endodontics at D Y Patil School of Dentistry, with the chief complaint of spacing in the upper front tooth region. Patient's medical history did not reveal any systemic diseases and intraoral



examination revealed presence of midline spacing between maxillary central and an composite restoration on distal and mesial surface of tooth 11 and 21 respectively (Figure 1). No dental caries were observed in both

clinical and radiographical examinations. As a more conservative, economical, aesthetic, and quicker option, direct aesthetic composite restoration procedure for both maxillary central incisors were considered.



Fig 1 Preoperative

Firstly the shade selection was considered. Small blebs of A2, A3 and A3.5 composite restorative material (3M ESPE Filtek Z250 Xt Restorative Syringe) was placed on the teeth for shade matching and the shades for the teeth were decided post curing of the blebs. Once the curing of the blebs was done, the shade matching was done. A2 and A3 shade were selected for the restoration procedure. A3 shade was used as the palatal layer and subsequently A2 was used as the superficial layer. The anterior maxillary teeth were isolated using rubber dam (Coltene Rubber Dam Kit Hygienic) (Figure 2). The old composite

restoration of teeth 11 and 21 was removed, bevels were given on the labial and lingual surfaces of 11 and 21 with a tapered fissure bur and the adjacent teeth was covered with Teflon band. (Figure 3)it was decided to restore tooth 21 first, 37% phosphoric acid was applied on the mesial surface to be restored for 15 seconds, rinsed for 20 seconds, and dried with air slightly. Mylar strip was placed (Figure 4) and then a single bottle bonding agent (Adper Single Bond, 3M ESPE, USA) was applied and polymerized for 20 seconds with a LED light generator.



Figure 2: Maxillary teeth was isolated using rubber dam



Figure 3: The old composite restoration was removed and the adjacent teeth were covered with Teflon band



Figure 4: Use of mylar strip to aid in creating a base for palatal layer and in contouring the margins  
The restoration of tooth 21 was initiated with layering technique. A palatal layer was first made incrementally taking in account the mesial and distal margins and cured for 20 seconds per increment. Gradually labial layers were placed and incisal margins were formed with composite instruments and brushes. A3 shade was used as the palatal layer and subsequently A2 was used as the superficial layer. Labial surfaces of the restorations were flattened by using a red banded knife-edge tip

diamond bur. Occlusion was checked in all excursions. Polishing discs (Shofu Super Snap Mini Kit CA) were used for detailed polishing from rough to fine grains by using a low speed handpiece. (Figure 5-7)

The patient was motivated for oral hygiene and informed for recalls. After a week recall, the restorations were just polished with polishing discs. After 2 months recall no sensitivities, discolorations, or fractures were detected on the teeth and the restorations (Figure 8-9)



Figure 5: After gross finishing



Figure 6: Palatal view



Figure 7: After final finishing and polishing





**Figure 8: A week follow up**

#### Discussion:

Median diastema may result from developmental, pathological and iatrogenic factors. Determining the best manner of closing an unwanted diastema must be predicated upon a diagnostic evaluation of the diastema size, the length and proportion of the clinical crowns of the teeth involved, wear factors, occlusion and anterior guidance.

Resin-based composite restorations are single-visit procedures and bypass laboratory work which reduces cost of the treatment. They usually do not require wax-ups and preliminary models. In addition to this, some added advantages that these restorations have over other common treatment modalities are that (a) they are gentle towards the opposing

dentition, unlike ceramic materials and (b) they are easy to repair in case of fracture. With porcelain restorations, any modification means a return-trip to the laboratory for correction.<sup>(5,6)</sup> However, there are some distinct disadvantages that these restorations possess which makes case selection critical. Composite restorations possess less color stability compared to ceramics. This of course is related to the degree and quality of polishing but also depends on the patient maintenance<sup>(7)</sup>. Our patient demonstrated good oral hygiene and was given further instructions regarding the same. Secondly, they possess less fracture toughness and compressive and shear strength and hence are not suited for high-stress bearing areas<sup>(8)</sup>. In spite of these disadvantages, the

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clinicians have been offered the best quality resin materials today which allow them to yield esthetic, functional, economical, and durable restorations. We chose to close the diastema using composite restorative material because it was the most conservative treatment possible, the patient exhibited good periodontal health, and also the patient was not willing for an expensive treatment. Excellent outcomes have been reported by numerous authors who have used resin composites for diastema closures<sup>(9,10)</sup>. Willhite proposed three criteria for successful diastema closure: an increased emergence profile with natural contours at the interface between the gingiva and tooth; a completely closed gingival embrasure (i.e., no black triangle); and a smooth subgingival margin that does not catch on or shred dental floss<sup>(11)</sup>.

The composite resins used for anterior restorations must demonstrate good handling (nonsticky and nonslumping) and aesthetic (polishability) characteristics. Though the technique mentioned in this report is easy to perform, but the creation of correct midline and optimal contact area requires experience and skill. The dentist should be well experienced with both the technique and the restorative material to perform the procedure correctly.

A common technique of restoring diastemas is to make impression of the wax-up model and fabricating a silicon putty-index<sup>(12)</sup>. However, in this case using another technique using direct composite restoration with layering technique was decided. One of the biggest challenges that the clinicians face is the failure to avoid “black triangles” when closing diastemas. The restorative technique described here can be applied with relative ease to avoid the “black triangles.” Apart from silicon putty-index technique and common indirect restorative therapy like ceramic veneers, an indirect ceramic restoration called the “ceramic fragment” is also a treatment option for these

cases. However, being an indirect procedure, it requires at least two appointments.

Prabhu et al. conducted a study in which midline diastema closure was done in maxillary and mandibular central incisors in a total of 45 patients. Recall visits were made every 6 months for a period of 60 months<sup>(13)</sup>. The authors stated that composite restorations exhibited satisfactory survival rates. Similarly, Demirci et al. evaluated direct composite build-ups for space closure after orthodontic treatment for 4 years and concluded that survival rates for the restorations were favorable for the specified period. Taking into account that failures such as discoloration, marginal leakage, fracture, and debonding usually occur within 6 months of the placement of the restoration, these long-term studies seem to be predictable indicators of long- life of composite restorations<sup>(14)</sup>.

#### Conclusion:

The closure of diastemas in the anterior zone to improve the patient’s smile has been presented with direct composite resin restorations. The development of form, function, and esthetics with direct resin can be achieved with proper meticulous technique to provide the patient with a natural looking smile.

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