



CASE REPORT

Aesthetic Management of Anterior Midline Diastema with Direct Resin Composites- A Case Report

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Abstract

Midline diastema is a common complaint in patients seeking aesthetic dental procedures. The max-illa has shown to have a higher prevalence of midline diastema than mandible. Various physiological and pathological factors can lead to midline diastema. These include the presence of a high labial frenal attachment, microdontia, habits such as finger sucking, tongue thrusting, or lip sucking, dental malformations, dental-skeletal discrepancies, and imperfect coalescence of the interdental septum. Selection of the technique and material for an effective treatment are usually dictated by time, physical, psychological and economical limitations of the patient. Direct composite resins in diastema cases allow dentist and patient complete control of these limitations and formation of an aesthetically pleasing and natural smile. This article presents the aesthetic rehabilitation of anterior midline diastema with direct composite resin using the putty index technique.

KEYWORDS

Aesthetic Dentistry, Diastema, Direct Composite Resin, Putty Index Method

1 | INTRODUCTION

Maxillary anterior spacing or diastema is one of the common aesthetic complaint among patients.¹ It has been described as spacing between the proximal surfaces of adjacent teeth in the anterior midline measuring > 0.5 mm.² The incidence of true maxillary midline diastema is (SI1.6%) more than that of true mandibular midline diastemas (SI0.3%).³ The aetiology of midline diastema is multifactorial, causes being physiological and/ or pathological in nature such as high frenal attachment, incomplete coalescence of the interdental septum, presence of a mesiodens or peg-shaped lateral incisors, congenital absence of lateral incisors, pathologies (e.g., cysts in the midline region), habits such as tongue thrusting, and/or lip sucking, discrepancy in the dental and skeletal parameters, and genetics.⁴ Based on the etiology, the treatment plan may include a multi-disciplinary approach or the closure of the space using direct and/or indirect restorative materials.

This further depends on the alignment and dimensions of the teeth being restored.⁵ Hence, the assessment of tooth size and distribution of the space manually or using digital smile designing becomes an important tool in providing a natural smile.

The composite resins used for anterior restorations must exhibit good aesthetic characteristics. Availability of composite resins with superior mechanical properties and excellent polishability allows the clinician to mimic the natural dentition as well as renders a long-lasting restoration to the patient. Nanohybrid composites are hybrid resin composites with nanofiller in a pre-polymerized filler form, recently launched, that involve a combination of high initial polishing and supreme polish and gloss retention.⁶ Additionally, composite resin allows a conservative treatment and offer quicker results.⁷

The use of putty index technique aids in acquiring a predictable anterior composite build up. This technique uses an impression of the diagnostic mock up to produce a palatal silicone index. This can be then used to transfer the required anatomy into the mouth during treatment further improving the treatment outcome.⁸ This case report describes a direct aesthetic midline diastema closure using putty index technique.

Abbreviations: ANA, anti-nuclear antibodies; APC, antigen-presenting cells; IRF, interferon regulatory factor.

2 | CASE REPORT

A 32-year-old male patient reported to the Department with the chief complaint of spacing in the upper front tooth region. The patient stated that the spacing was causing him social embarrassment and lowering his self-esteem. Patient had no associated symptoms, relevant past dental or medical history. The intraoral examination revealed the presence of midline diastema between maxillary central incisors (3.5mm) secondary to tongue thrust habit confirmed by performing clinical tests (Fig 1) and spacing between the mandibular incisors. On radiographic examination no evident pathologies were detected. The first line of treatment suggested to the patient was to undergo orthodontic treatment for closure of the diastema and spacing between the mandibular incisors. However, as the patient was not willing for the same and wished for a faster and conservative approach, direct composite restorations for midline closure of midline diastema using a direct composite build up using putty index was planned. Lower teeth spacing was not addressed as patient for not willing for the same. Informed consent from the patient was taken, and complete treatment plan was discussed with the patient. In first appointment, diagnostic impression and cast were made. Following the dental analysis of the patient, diagnostic wax up done on the cast (Fig 2 (a)) and a putty index was created (Fig 2 (b)). The fit of the putty index in the mouth was confirmed.

Following oral prophylaxis, shade selection was done using button technique under natural daylight (Fig 3 (a) and (b)). A1 shade of Filtek™ Z350 XT (3M/ESPE, St. Paul, MN, USA) was selected. Split-dam technique was used to isolate the maxillary teeth as the conventional rubber dam placement technique hindered the placement of the putty index palatally. In order to simulate natural A1 shade outlook, the shade A1 dentine and A3 enamel composite resin (Filtek Z350, 3M/ESPE, St. Paul, MN, USA) were used as layers. No preparation was done on the tooth surface prior to restoration. (SI37%) phosphoric acid (Etching Gel, Kerr, USA) was applied on the mesial surface of both the central incisors to be restored for 15 seconds, rinsed for 20 seconds, and dried with oil-free air (Fig 3 (c)). Then, two coats of a single bottle bonding agent (One Coat Bond SL Coltene, Switzerland) were applied using applicator tips (Fig 3 (d)) and cured for 20 seconds with an LED light (Bluephase N MC, Ivoclar Vivadent, Schaan, Lichtenstein). Care was taken to apply uniform coats of the bonding agent on the proximal tooth surfaces especially near the gingival area since pooling of the bonding agent may compromise the solvent evaporation, after careful application of the bonding agent near the sulcus, it was air-thinned using a three-way syringe. A thin layer of A3 shade composite resin was placed palatally on the putty index as enamel and placed into patient's mouth and cured for 40 seconds. A palatal shell of composite bonded to the tooth was formed by carefully removing putty index (Fig 3 (e)) which served as a reference for further placement of composite.

A1 dentine shade was placed in increments and manually contoured over the mesial surface of both the incisors using a long bladed titanium instrument. Posterior sectional matrix system was used to build

the proximal surface of the teeth. A thin layer of A3 shade was used as the top enamel layer. All increments were cured for 40 seconds, both from labial and palatal aspects. The occlusion was verified in both centric and eccentric relations using an articulating paper. Gross finishing was done using Tungsten carbide bur 134 014 (16 flutes yellow band). Final finishing was done using Shofu Super snap rainbow kit (Shofu INC, Japan). CompoSite Fine polishing tips (Shofu INC, Japan) were used along with polishing paste (Platina Hi-Gloss Composite polishing paste, PrevestDenPro) for polishing. The patient was motivated to maintain oral hygiene and instructed to floss before tooth brushing regularly and to avoid pigmented liquids cause staining of restoration. The patient has been recalled after 6 months for follow up.

3 | DISCUSSION

Various treatment modalities are available for closure of midline diastema such as orthodontic treatment, an indirect ceramic restoration, direct composite resins or an interdisciplinary approach.⁷ Direct composite resins are indicated for minimal to moderate diastema closure and when preservation of tooth structure is a priority serving as the most conservative approach.^{4,9} In this case report, a direct composite restoration was used for diastema closure as the patient was not willing to undergo an orthodontic treatment or habit correction and wished for a faster and conservative approach. However, the patient was made aware of the impermanence of such a closure as the aetiology was not addressed adequately during the treatment. Nonetheless, excellent outcomes have been reported by numerous authors who have used composite resins for diastema closures pertaining to the longevity (SI88%) up to 10 years and aesthetic outcome of such restorations.^{5,10,11} Highly aesthetic restorations made up of composite resins are now possible because of constant improvements in techniques, materials, and technology. The introduction of nanometer-sized particles has been one of the latest developments in the field which is said to offer superior aesthetics and polishability required for anterior restorations. Filtek Z350 (3M ESPE, St. Paul, MN, USA) employed in this case report, is nanocomposite on the market that contains nanometric particles (nanomers) and nanoclusters (NCs). It shows high translucency, high polish and polish retention similar to those of micro-filled composites whilst maintaining the physical properties and wear resistance equivalent to those of several hybrid composites.¹² Successful restorations rely mostly on the effective control of moisture and saliva from the tooth being restored as contamination remains an important cause of bond failure. Therefore, rubber dam isolation was done in this case to prevent moisture contamination. A silicone putty index was used in this case as it perfectly defines the sagittal dimensions, the length, and the incisal edge position, incisal thickness, mesial and distal line angles of the required final restoration; it reduces the need for extensive final finishing and polishing procedures. Hence, the practitioner can fully target the application of composite layers.⁸ Putty index technique is easy to perform, and it creates correct midline with optimal contact area. Additionally, this technique allows



Fig 1: Pre-operative intraoral image of patient with midline diastema; (a) Frontal view; (b) Right lateral view; (c) Left lateral view.

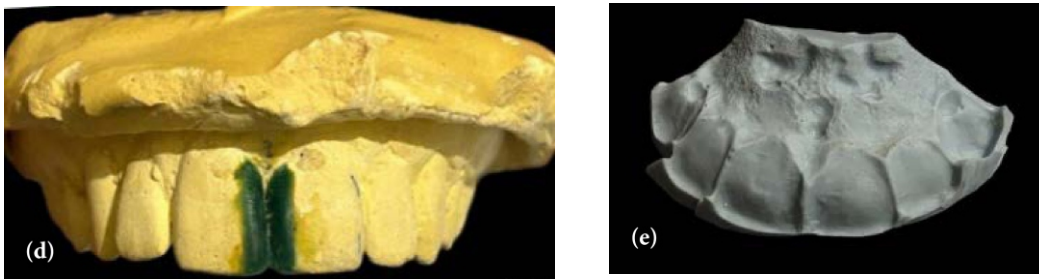
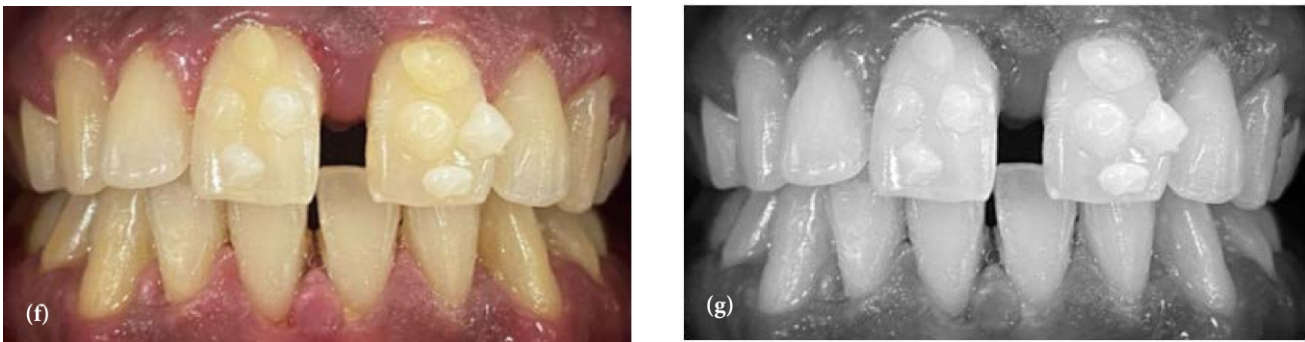


Fig 2: (a) Diagnostic mock up (b) Silicone putty index





the clinician in reproducing the palatal anatomy accurately overcoming the most challenging part of anterior restorations. Dual layering technique was used in this case to mimic the three-dimensional appearance of natural teeth. For an overall shade of A1, Dentine A1 and Enamel A3 was used in layers. However, there were certain limitations in the case presented such as the impermanence of diastema closure as the aeti-ology was not address adequately during the treatment. Furthermore, there are some distinct disadvantages of doing composite restorations. Dual layering technique was used in this case to mimic the three-dimensional appearance of natural teeth. For an overall shade of A1, Dentine A1 and Enamel A3 was used in layers. However, there were certain limitations in the case presented such as the impermanence of diastema closure as the aetiology was not address adequately during the treatment. Furthermore, there are some distinct disadvantages of doing composite restorations as they posses less colour stability compared to that of ceramics. This of course is related to the quality and degree of polishing but also depends on the patient maintenance.¹³

4 | CONCLUSION

The clinical outcome of this case report demonstrated that the putty index replicating the palatal region for composite restoration can be a reliable procedure for direct composite restorations. Nanohybrid composites can be used to provide an acceptable colour match along with a conservative approach. Though some disadvantages are noted, such as discolorations, when used judiciously, they can serve as the material of choice for patients with aesthetic problems of anterior teeth and with maintainable hygiene practice.

CONFLICT OF INTEREST

The Authors declare no Conflict of interest.

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