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## RESEARCH ARTICLE

# SINGLE APPOINTMENT AESTHETIC SPACE CLOSURE OF MAXILLARY ANTERIORS: ONE YEAR FOLLOW-UP

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**ABSTRACT**

**Introduction:** Maxillary anterior spacing is a common aesthetic complaint of patients, which has a multifactorial aetiology. Many therapies ranging from orthodontic intervention to full coverage porcelain crowns, laminate veneers, composite build-ups are available. The use of proximally applied composite resin is a quick, inexpensive and conservative approach to this difficult problem. It allows the dentist and patient complete control in formation of a natural smile. **Aim:** Closure of maxillary anterior spacing in single appointment. **Method:** In this case report maxillary anterior spacing was closed with direct composite resin restoration in one appointment without any laboratory preparation. **Result:** Complete aesthetic closure of the spaces. At six-month and one-year recalls, restorations had no fractures and margins demonstrated no discoloration. **Conclusion:** Composite resin augmentation serves as an excellent treatment option for anterior spacing for patients unwilling to undergo orthodontic treatment or in whom previous orthodontic treatment has not produced an acceptable result.



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## INTRODUCTION

Cosmetics and aesthetics are current trends of our society that also involve the dental profession, especially the restorative dentistry (Ardu, 2006). Maxillary anterior spacing is a common aesthetic complaint of patients (Koora *et al*., 2007). Keene described midline diastema as anterior midline spacing greater than 0.5 mm between the proximal surfaces of adjacent teeth (Keene, 1963). The midline diastema has a multifactorial aetiology. In addition to the labial frenulum, microdontia, mesiodens, peg-shaped lateral incisors, lateral incisor agenesis, cysts in the midline region, habits such as finger sucking, tongue thrusting, and/or lip sucking, dental malformations, genetics, maxillary incisor proclination, dental-skeletal discrepancies, and imperfect coalescence of the interdental septum should be considered factors that can cause diastema (Weber, 1972). Orthodontic space closure is often the treatment of choice, particularly for young patients. Prosthodontic treatment with full-coverage porcelain restorations can also provide an aesthetic and functional result (Goldstein, 1976).

However, this approach requires radical reduction of healthy individual teeth. The use of laminate veneers has also been considered (Banker *et al*., 1982). Although it is a less invasive procedure than crowning, veneering requires unnecessary coverage of the entire facial surfaces of the involved teeth, with the attendant problems of colour, contour, harmony, and soft tissue compatibility at the gingival margin. Although each of these procedures may have definite indications and advantages in certain patients, all have significant shortcomings that compromise their effectiveness in treatment of anterior interdental spacing. The use of proximally applied composite resin is often a quick, more practical and conservative approach to this difficult problem (Goldstein, 1976; Banker, 1982).

**Case report 1:** A 20-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, Regional Dental College, Guwahati, with the chief complaint of spacing in the upper front teeth region. Patient's medical history did not reveal any systemic diseases and intra-oral examination revealed presence of multiple spacing between maxillary anterior teeth with anterior proclination and a deep

bite. No dental caries were observed in both clinical and radiological examination. Patient was unwilling for the orthodontic treatment and hence was referred to the department for conservative management. As a more conservative, economical, aesthetic, and quicker option, direct aesthetic composite build-ups for the anterior teeth in a single appointment were considered.

Patient was made aware of the anticipated changes in tooth contour that will occur as a result of composite resin addition, also the shortcomings of this procedure were explained. Before isolation, shade selection was considered, after which all maxillary anteriors along with the first premolars were isolated with rubber dam. To prevent hindrance to access to subgingival areas the rubber dam sheet was pulled upwards and fixed. The proximal surfaces that extend from the facial line angle to the lingual line angle were lightly roughened with a coarse straight fissure diamond instrument. 37% phosphoric acid (ETCH, d-tech) was applied on the prepared enamel to be restored for 15 seconds, rinsed for 20 seconds, and dried with air slightly. Then a single bottle bonding agent (Single Bond Universal Adhesive, 3M ESPE) was applied and light cured for 20 seconds. Composite resin (Filtek Z250 XT, 3M ESPE) was then carefully placed in increments and light cured on each proximal surface. The last layer was carefully placed and contoured using a matrix strip.

Finishing and polishing was achieved with composite finishing white stones (Shofu Composite Finishing Kit) and polishing discs (3M ESPE Soflex Contouring Polishing Discs). Finishing and polishing strips (3M ESPE Soflex Strip) were used for completing the proximal contours. All teeth were sequentially treated after one another to the desired contour. Patient was cautioned not to bite hard food or objects because of the potential for fracture of the composite resin additions. Patient was informed that the restoration might need eventual replacement because of staining, wear, or discoloration. Patient was recalled for follow-ups.

**Case report 2:** A 25-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, Regional Dental College, Guwahati, with the chief complaint of spacing in the upper middle teeth region. Patient's medical history did not reveal any systemic diseases and intra-oral examination revealed presence of anterior midline diastema with anterior maxillary proclination. No dental caries were observed in both clinical and radiological examination. Patient was unwilling for the orthodontic treatment and hence was referred to the department for conservative management. Again in this case as well, direct aesthetic composite resin build up for the closure of midine diastema was considered. The procedure followed was exactly the same as in Case 1, except that for proper access, isolation was done using cotton rolls and a size 00 retraction cord (Ultrapak #00, Ultradent Products) on the central incisors was used as teeth involved were less, and isolation could be achieved successfully with this.

**Case report 3:** A 23-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, Regional Dental College, Guwahati, with the chief complaint of spacing in the upper front teeth region. Patient's medical history did not reveal any systemic diseases and intra-oral examination revealed presence of maxillary anterior spacing involving the incisors. No dental caries were observed in both clinical and radiological examination. Patient preferred a quick treatment option due to personal aesthetic concern and hence was referred to the department for conservative management. Again in this case as well, direct aesthetic composite resin build-up for the closure of anterior spacing in a single appointment was considered. The procedure followed was exactly the same as in Case 2.

## DISCUSSION

Direct resin-based composite build-up was used to correct maxillary anterior spacing in all these above mentioned cases. This is a biomimetic, functional, and biologically prudent treatment option for closing diastemas with clinically promising survival rates, especially in cases wherein minimally invasive or non-invasive procedures on healthy teeth are indicated (Wolff *et al*., 2010). It has a survival rate nearly 85% after 5 years, with the majority of restorations reaching excellent or good quality (Frese *et al*., 2013) which is similar to the survival rate exhibited by laminate veneers (above 90% in 10 years) (Layton *et al*., 2007). Most composite materials possess less fractural toughness, shear and compressive strength and are not ideally suited for ultra-high stress areas for eg; presence of unmanaged parafunctional forces such as bruxism, Class III end-to-end occlusal schemes, or noxious oral habits such as nail biting (Hemmings *et al*., 2000). But despite these, there are numerous advantages offered by them which are the following: (1) tooth shape, colour, and position can be corrected in one treatment session (2) non-invasive or minimally invasive technique (3) the technique is reversible (4) in case of minor failure, the restoration can be repaired (5) in case of major failure, other treatment options (laminate veneers, crowns) can be applied and (6) cost-effective technique, requiring little or no laboratory work (Wolff *et al*., 2010).

In these case reports, direct composite resin restorations were planned as the treatment method due to aesthetical demands of the patient having restricted time and money, and non-willingness for an orthodontic treatment. All the three cases were done in single appointment each. The direct composite resin restorations can be placed in a single visit, often do not require preliminary models or wax-ups, and do not involve laboratory fees that escalate costs (Korkut *et al*., 2016). As rubber dam isolation is a "gold standard" approach for restorative procedures, some authors recommend it should be used whenever possible (Cajazeira, 2014). Whereas according to Heymann *et al*. a rubber dam is not recommended for this procedure because it obscures the interproximal papilla and limits access to subgingival regions. The proximal surfaces should be isolated with appropriate-sized retraction cord, which holds the gingival tissue away from the tooth and prevents seepage and contamination by crevicular fluids (Heymann, 1985). In the first case, teeth were isolated with rubber dam as multiple teeth were involved, whereas in the other two cases use of retraction cord and cotton rolls was found to be more appropriate. Proximal surfaces of teeth were roughened as it creates more surface area for bonding and removes the outer few microns of fluoride-rich enamel, which may be resistant to acid etching. This treatment of the enamel significantly improves the retention of the composite addition (Aker, 1939). Addition of composite resin to previously untreated healthy enamel allows the composite resin to be bonded only to the enamel surface of the tooth, and due to the low configuration factor of the restorations no relevant stress

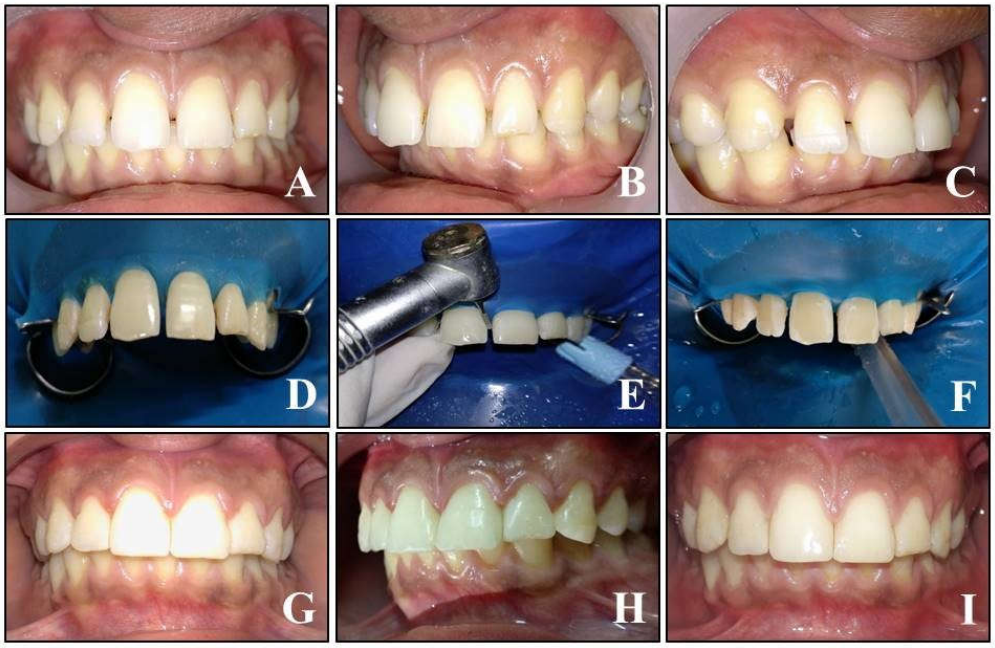


**Figure 1. A-C – Pre-operative photographs showing maxillary spacing between anterior teeth. D- Isolation of teeth using rubber dam. E- Proximal surfaces lightly roughened with a coarse straight fissure diamond instrument. F- White frosty appearance of etched enamel. G-H- Post-operative photographs after bonding and composite resin build up on the proximal surfaces I- One year follow-up photograph**


**Figure 2. A- Pre-operative photograph showing midline diastema. B- Isolation with cotton rolls and retraction cord C- Post-operative photograph after space closure using composite resin**

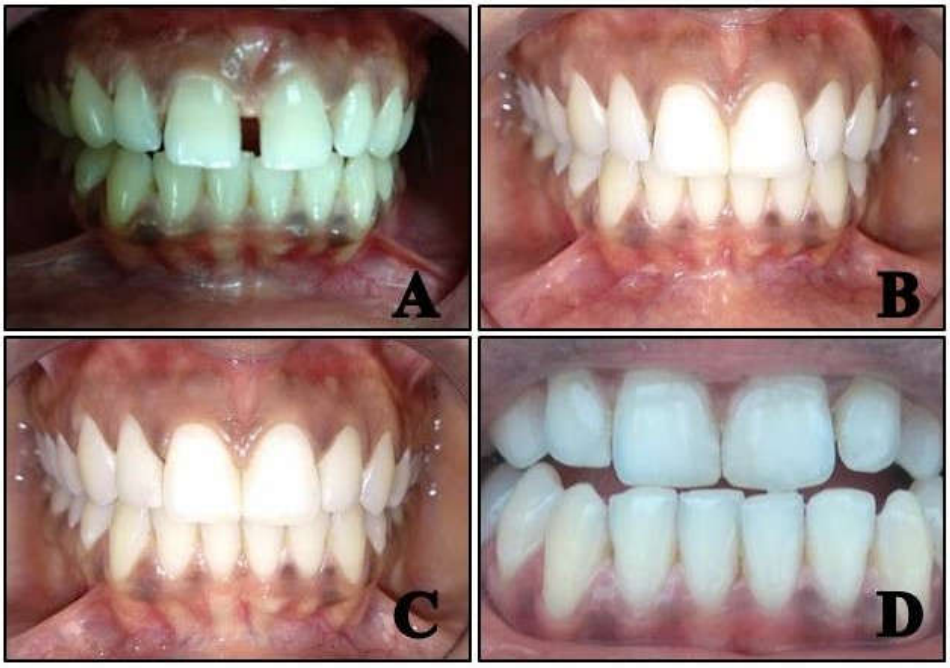


**Figure 3. A- Pre-operative photograph with spacing in between central incisors and lateral incisors B- Closure of spacing in between central incisors. C- Closure of spacing between ipsilateral central and later incisor D- Photograph on one year follow-up**

will arise during polymerization shrinkage, making the microleakage less probable (Lenhard, 2008). At six-month and one-year recalls, restorations had no fractures and margins demonstrated no discoloration. Although further long term follow-ups are required, restoration problems such as marginal leakage, discolorations, fractures, and debonding for composite resins generally appear within 6 months after the treatment.

**Conclusion**

Hence, by using an appropriate technique and modern materials, one can perform highly aesthetic and durable direct composite resin restorations for anterior space closure in a single appointment without any laboratory procedure that can satisfy patients as under the conditions of the cases presented. This method is comparatively inexpensive. Composite resin augmentation provides an excellent treatment alternative for patients who are unwilling to undergo orthodontic treatment or in whom previous orthodontic treatment has not produced an acceptable result.

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