

A case report on perio - restorative approach to correct midline diastema

Khondoker EM¹; Kabir MA²; Uddin MF³

Abstract

Midline diastema is a major aesthetic concern for all young patients. Etiology includes abnormal frenum attachment, oral habits and various dental anomalies. Effective treatment requires an accurate diagnosis and a collaborative approach that addresses the various underlying causes. A 19-year-old girl presented with the chief complaint of midline diastema. The high frenum attachment and the residual interseptal tissue present an additional obstacle and its removal was the part of the solution to the aesthetic problem. The treatment plan called for Perio- restorative approach which was used to manage the case and achieve an attractive smile.

Keywords: Midline diastema, high frenum, diastema, dual layering technique, nano filled composite, restorative approach
(Pioneer Journal of Dental Research & Health Science, Vol.02, No.01.)

Affiliation

Dr. Mohammad Erfan Khondoker
Lecturer
Dept of Periodontology & Oral Pathology
Pioneer Dental College, Dhaka, Bangladesh.

Dr. Md. Arafat Kabir
Associate Professor
Head of the Department
Department of Periodontology & Oral Pathology
Pioneer Dental College, Dhaka, Bangladesh.

Dr. Md. Farid Uddin
Professor (CC)
Head of the Department
Department of Conservative Dentistry & Endodontics
Pioneer Dental College, Dhaka, Bangladesh.

Article Information

Received Date: 13.03.2025

Accepted Date: 06.04.2025

Volume: Vol.02, No.01.

Address of Correspondence:

Dr. Md. Arafat Kabir
Associate Professor
Head of the Department
Department of Periodontology & Oral Pathology
Pioneer Dental College, Dhaka, Bangladesh.
Email: kabiranan@yahoo.com

Introduction

Midline diastema refers to a gap exceeding 0.5 mm between the proximal surfaces of adjacent teeth at the midline. Various factors contribute to this condition, including an ankylosed central incisor, flared or rotated central incisors, anodontia, macroglossia, dentoalveolar disproportion, localized spacing, closed bite, facial type, ethnic and familial traits, inter-premaxillary suture, and midline pathology. Weber identified causes such as macrognathia, supernumerary teeth, peg-shaped laterals, missing lateral incisors, midline cysts, and habits like thumb sucking, mouth breathing, and tongue thrusting¹. Angle attributed midline diastema to an abnormal frenum². Keene noted that the occurrence of maxillary and mandibular midline diastema is 14.8% and 1.6%, respectively³. A temporary midline diastema often appears during the mixed dentition phase⁴. Effective treatment requires accurate diagnosis and timely intervention tailored to the specific cause. Treatment options include orthodontic removable or simple fixed appliances, frenum excision, restoration techniques using direct composites, laminates, veneers, ceramic restorations, mesiodens extraction, and habit-breaking appliances.

CASE REPORT

A 19-year-old female patient presented with a single diastema between maxillary central incisors (Fig 1a). The Diastema had been a aesthetic concern for an extended period of time. Medical and dental histories were completed and reviewed; care was taken to evaluate the complaint from the view point of the patient. Intraoral examination revealed presence of high frenum attachment and midline spacing between maxillary central incisors of 4mm. Tension test was done to confirm the attachment of the frenum to the marginal gingiva. A periapical radiograph of the intraoral region was performed to check for the existence of mesiodens. The attainment of a proportional aesthetic result required careful treatment planning and pretreatment identification of all potential treatment limitations. A Perio-Aesthetic-Restorative Multiphase Management was planned for the case and a informed consent was taken from the patient.

Perio – Aesthetic Management of Frenum

Mucogingival health plays a crucial role in both the aesthetic appearance of the periodontium and the success of restorative procedures. In this case, a high frenum attachment was the primary cause of midline spacing and hindered oral hygiene maintenance. A frenectomy was conducted using local anesthesia. A hemostat was used to grasp the frenum, reaching the vestibule's depth. An incision was made with a Bard Parker blade no.15 along the hemostat's upper surface, extending past its tip. A similar cut was made along the hemostat's lower surface. The triangular section of the frenum was excised using the hemostat, revealing the fibrous attachment to the bone beneath (Fig 1c). A horizontal incision was made to separate the fibers, and sutures were placed (Fig 1c). The surgical area was cleaned and covered with a periodontal pack, which was removed after two weeks (Fig 1d). Typically, it takes about a month for the mucosa to fully form with the frenum in its new position. Inadequate healing time can prevent complete collagen maturation, gingival shrinkage, and changes in the shape and contour of the interdental papilla. Therefore, periodontal health must be ensured before starting any restorative treatment.

Restorative Management of the Midline Diastema

Patients increasingly seek aesthetic dental procedures that preserve healthy tooth structure and require minimal intervention. Consequently, composite resin has become an important restorative option for anterior aesthetic corrections. Contemporary composites exhibit improved fluorescence, translucency, polishability, and optical properties, allowing restorations to closely reproduce the appearance of natural enamel and dentin. Their conservative nature and satisfactory clinical durability make them particularly useful for aesthetic correction of anterior teeth. Successful outcomes, however, depend on the clinician's understanding of composite characteristics and appropriate material selection according to the clinical situation. Available systems include microfilled, hybrid, microhybrid, and newer nanocomposite formulations. Improvements in the physical and optical performance of these materials have expanded their application in highly aesthetic restorations.

This case demonstrates how appropriate materials, clinical techniques, and contemporary equipment can produce subtle restorative changes while achieving the patient's desired smile. Diastema closure was performed by adding composite resin to the proximal surfaces of the teeth adjacent to the space. Gingival retraction was achieved by positioning a plastic matrix slightly below the gingival margin and adapting it against the lingual tooth surface. Limited preparation was performed with diamond burs to provide surface roughness for improved adhesion and to create bevels at the restoration margins, allowing a gradual transition between the composite and the underlying tooth structure. The enamel preparation also exposed the enamel prism structure, contributing to effective bonding.

Either central incisor may be restored first, depending on the clinician's preference. Among the various technical considerations, reproducing the natural tooth colour is often

the most demanding. A harmonious result depends on selecting an appropriate composite shade, controlling the thickness of each increment, and accurately positioning the material during layering. In the present case, the left central incisor was conditioned with phosphoric acid for 20 seconds, subsequently washed and air-dried. The enamel demonstrated a satisfactory etching pattern. A bonding system was then applied and uniformly dispersed using gentle air pressure. As the preparation remained confined to enamel, no dentin shade was required; an opaque dentin shade and translucent enamel resin were selected.

Composite was placed in small increments and shaped directly by hand to reproduce the desired tooth morphology. Each completed layer was light-cured, with the final restoration receiving 40 seconds of curing. The facial contour was refined using hand instruments before additional light polymerization. Final contouring and surface refinement were performed with composite finishing burs. After restoration, the mesiodistal width was assessed and compared with the corresponding dimensions of the adjacent tooth and the remaining space. Minor discrepancies were corrected using finishing burs or abrasive discs. The neighbouring central incisor was subsequently restored following the same protocol.

Accurate adaptation of the composite at the interface between the two restored teeth was achieved by positioning the matrix firmly against the previously placed composite and stabilizing it with an instrument during light curing (Fig. 1e). Management of the gingival embrasure represents another important consideration in diastema closure because the interdental papilla may appear relatively flat, leaving a visible dark triangular space. Extending the composite contact area apically and slightly toward the lingual aspect increases the restorative volume and can encourage the papilla to occupy a more coronal and facial position within the embrasure, thereby reducing the residual black space.

The optical environment behind the anterior teeth also influences the final appearance of a restoration. Because the oral cavity posterior to the teeth provides a relatively dark background, inadequate control of translucency may make the restoration appear excessively grey or dull. Incorporating an appropriate opaque composite layer on the lingual aspect can mask this background and contribute to a more lifelike appearance. Such an opaque layer may be unnecessary in very small diastemas or when the teeth have substantial buccolingual thickness.⁴

Composite resin represents a practical option for diastema closure because it can be highly polished, provides satisfactory clinical durability, and can reproduce the colour and optical characteristics of natural dental tissues. Compared with indirect restorative procedures, direct composite bonding generally requires less removal of sound tooth structure. Furthermore, freehand application allows precise control over tooth form, contour, contact, and aesthetics, facilitating integration of functional and cosmetic objectives while potentially contributing to the long-term performance of the restoration.⁵⁻⁶

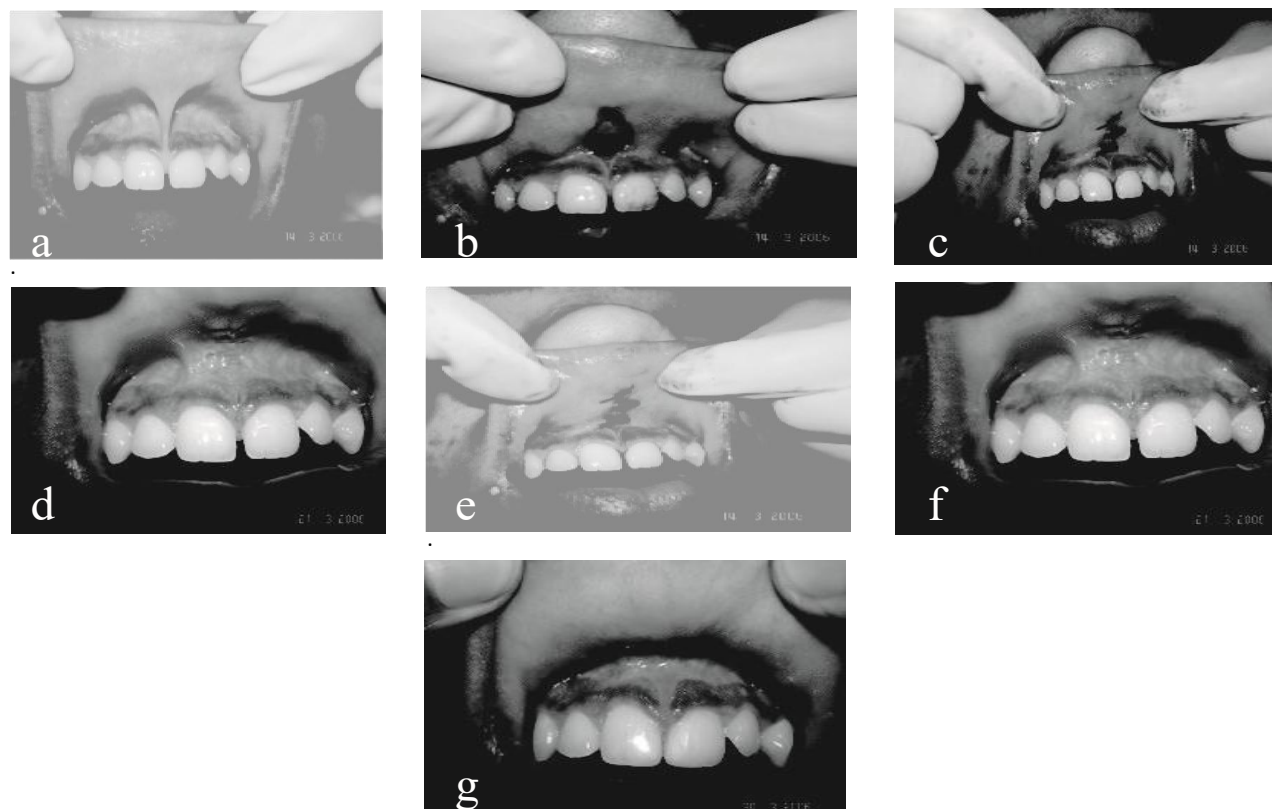


Figure 1: Procedure of frenectomy

Conclusion

Successful diastema closure requires careful assessment of aesthetic expectations, functional needs, and biological considerations. Treatment planning should involve shared decision-making between the clinician and patient to identify the most appropriate and conservative approach for the individual case. Proper case selection and material choice can achieve satisfactory aesthetic results while preserving dental function and biological integrity. In this case, the patient's treatment goal was successfully accomplished through a limited number of minimally invasive procedures, producing an outcome beyond her expectations. Knowledge of contemporary restorative materials and appropriate use of modern technologies can further support predictable, conservative, and aesthetically pleasing dental treatment.

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