

An interdisciplinary approach for the closure of midline diastema using esthetic buttons

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ABSTRACT

This case report intended to evaluate the clinical outcome of the esthetic buttons for midline diastema space closure rather than full conventional fixed appliance therapy followed by conventional frenectomy. Four esthetic buttons were placed on the central incisors (2 on each tooth) for complete bodily movement of the teeth followed by traction. Space closure was achieved by a 1-month time interval followed by a build-up of lateral incisors and followed by frenectomy. This approach can be followed in patients with compromised financial support who are seeking orthodontic treatment for minor correction and with compromised periodontal support as this delivers less force with great comfort. Patients who are hesitant to begin treatment due to financial obstacles with fixed appliance therapy may find this helpful.

Key words: Esthetic button, Frenectomy, Midline, Translation


The word “Diastema” means interval in Greek. In dentistry, this term is used to describe the space or gap between two or more teeth that are located close to one another. Anterior midline diastema is characterized by a separation of more than 0.5 mm between the proximal surfaces of central incisors [1]. Midline diastema is commonly seen in the maxillary arch while rarely in the mandibular arch [2]. Many children experience a midline diastema with their permanent central incisors eruption [3]. When the incisors first appear, they may be separated by bone and the crowns will tilt distally due to root crowding [4]. The midline diastema will close or contract with the emergence of the lateral incisors and permanent canines. In some individuals, the midline diastema does not close naturally [5]. About 98% of 6-year-olds, 49% of 11-year-olds, and 7% of 12–18-year-olds are affected by midline diastemata (or diastemas) [6]. A midline diastema causes esthetic and psychological anguish, leading to patients seeking orthodontic treatment. The causes of midline diastema are numerous [7]. Some of the etiologic factors include proclination of maxillary incisor, labial frena, incomplete fusion of the interdental septum, pseudomicrodontia, supernumerary tooth like Mesiodens, peg-shaped lateral incisors, congenital absence of lateral incisors, pathologies (e.g., cysts) in the midline region, habits such as digit sucking, tongue thrusting, and/or

lip biting, the discrepancy in dental and skeletal parameters, and most commonly genetics [8]. Once the causative factor is determined, the treatment plan must be made whether to use a multidisciplinary approach for space closure or to simply fill the voids using direct and/or indirect restorative treatments [5]. There are several potential treatment approaches for midline diastema, including orthodontic equipment, restorative treatments, and prosthetic rehabilitation. A thoroughly prepared diagnosis enables the practitioner to select the most appropriate treatment approach primarily based on time limits, as well as physical, physiological, and economic challenges [9]. The rationale for using technique was simple, esthetic, and composite buttons in combination with elastics is an alternative technique for the closure of spaces in patients with good occlusion in posteriors and low financial budget.

This case report demonstrates a step-by-step practical guide for closure of midline diastema using a combination of orthodontic treatment, including cosmetic composite buttons and direct resin restoration, followed by frenectomy.

CASE REPORT

A 16-year-old female student brought aesthetic concerns about spacing in the upper front tooth region to the attention of the Department of Orthodontics, MINDS.

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Figure 1: (a) Pre-operative. Midline diastema in relation to 11 and 21; (b) marking the long axis of the teeth and cured flowable composites with separators; and (c) esthetic buttons frontal and lateral view

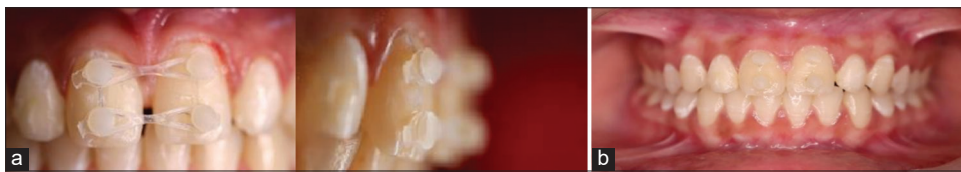


Figure 2: (a) Elastomeric chains placed (frontal and lateral view) and (b) A 4-week post-operative

All dental findings were negative except with midline diastema with a minor Bolton discrepancy (Fig. 1a). The patient was given the standard corrective measures. The patient had a positive attribute towards the treatment but had budgetary constraints. Therefore, esthetic buttons were selected since they were both aesthetically pleasing and reasonably priced, followed by a composite build-up of 12 and 22.

After appropriately prophylactically cleaning the labial and palatal surfaces of the anterior teeth that required treatment, they were etched with 37% phosphoric acid for 10 s, and then dried. The long axis of the tooth was marked with a graphite pencil (Fig. 1b) for the orientation of the buttons. A bonding agent was then applied and allowed to cure. Precision-cut radio opaque separators manufactured of latex-free elastomeric material were used [5-9] to give the template shape of the buttons. Over the treated two central incisors, four separators (two on each tooth – cervical and incisal) were placed provided with a cut. The flowable composite was filled inside the separators and cured for 10s. Following this, the separator was readily removed owing to the pre-cut that was made on it (Fig. 1c).

The short elastomeric chains were placed in the space created by the separators connecting the cervical and the incisal areas of 11 and 21 (Fig. 2a). In 2-week intervals, the patient was reevaluated. The E-chain was changed. At 4 weeks, the midline diastema closed without flaring the incisors. No black triangles or contact point irregularities have been noted (Fig. 2b). The esthetic buttons were removed and a fixed lingual retainer has been placed between 11 and 21 followed by a composite build-up of 12 and 22 (Fig. 3). Esthetic buttons can be replaced with prefabricated invisalign buttons. Using the same approach, cases with mild to moderate anterior spacing may be handled.



Figure 3: (a) Corrected midline diastema with composite build up irt 12 and 22 - frontal view; (b) Fixed lingual retainer in 11 and 21 - occlusal view; and (c) corrected midline diastema - lateral view

Using a No. 15 Bard-Parker blade, a wedge-shaped incision was made using a scalpel. The entire frenum was resected, and the underlying tissue was exposed. The surgical site was then irrigated with normal saline, and under all aseptic conditions, adequate haemostasis was achieved. 3–0 silk sutures were used, and simple interrupted sutures were given (Fig. 4).

After 1 week, the patient was recalled to have her sutures removed. During the healing phase, no unusual healing occurred. Six months of follow-up were spent with the patient (Fig. 5a). The result showed no signs of relapse (Fig. 5b).

DISCUSSION

Orthodontists should be prepared to decide on various treatment modalities with respect to the patient's dental condition and economic status. The anterior space or the midline diastema can



Figure 4: (a) Frenum held with haemostat; (b) sutures placed; and (c) a wedge shaped incision was given and frenum along with its alveolar attachment was removed

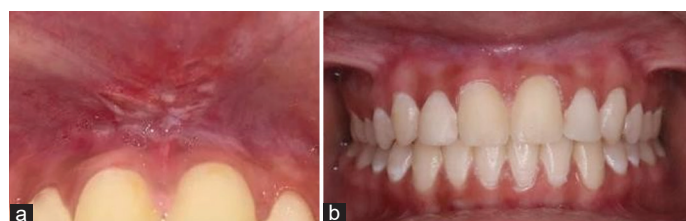


Figure 5: (a) Follow-up after suture removal and (b) follow-up after 6 months

be properly closed with this quick, attractive, and inexpensive treatment within 1 month. The idea of using two esthetic buttons in one tooth is to achieve a bodily movement of the tooth rather than tipping of the crown. Using this technique, iatrogenic possibilities such as the formation of black triangle, tipping of the crowns, and irregular contact points can be avoided. The esthetic buttons can be replaced easily with prefabricated invisible buttons.

High frenum attachment, microdontia, macrognathia, supernumerary teeth, peg laterals, missing lateral incisors, midline cysts, and habits like digit sucking, mouth breathing, and tongue thrusting are among the factors that contribute to maxillary incisor spacing [10]. Midline diastema can lead to poor appearance and provide a hindrance in orthodontic treatment. The presence of a wide and thick frenum attachment, which is a persistent cause of spacing between the upper anterior teeth, has to be treated as it may lead to failure or relapse of the orthodontic treatment [9].

The presence of a high frenal attachment is a potential reason for the midline diastema persistence; hence, it is now crucial to focus on the frenum has become critical [10]. Thick frenal attachments may be corrected surgically before or after orthodontic treatment. Excision before orthodontic therapy provides easier surgical access, but excision after orthodontic treatment allows for easier space closure without the production of scars [11]. This can be corrected by frenectomy or frenectomy techniques [9]. Archer (1961) and Kruger (1964) introduced the classical technique. This surgery is utilised to ensure the removal of the muscle fibres presumed to be joining the palatine papilla and orbicularis oris [12].

However, the choice of method used for frenectomy depends on the functional and esthetic outcome desired by the patient and

also on the type of frenum attachment. However, the majority of operations use surgical Frenectomy approaches such as the traditional (classical) technique and do not take into account appearances or the extent of the associated gingiva [13].

This technique was recommended to guarantee the ablation of the muscle fibres that purportedly connected the palatine papilla to the orbicularis oris in situations of midline diastema with an aberrant frenum [14]. The conventional method heals with primary intention, resulting in little scar development. Initial bleeding occurs, followed by epithelial cell migration and proliferation, which cause cut wound ends to approximate. There is also no granulation tissue formation [13].

This method would be clinically valuable, effective and it is an excellent solution for patients with esthetic needs but with a limited budget. Furthermore, this method is feasible to perform in patients with good posterior occlusion and close relapse of anterior spacing in pre-treated cases.

CONCLUSION

This straightforward and economical approach can be considered in the contemporary era of advanced orthodontic treatments. Patients who are hesitant to begin treatment due to financial obstacles with fixed appliance therapy may find this helpful. This technique was feasible to perform and resulted in the desirable results with complete patient satisfaction.

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