International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Correction of Midline Diastema - A Quick and Simplified Approach

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Abstract*: Maxillary midline diastema is a common esthetic problem in mixed and permanent dentition. The space can occur either as a transient malocclusion or created by developmental, pathological or iatrogenic factors. Many innovative therapies are available from restorative procedures such as composite build-up to surgery (frenectomies) and Orthodontics is available. Treatment depends upon the correct diagnosis of its etiology and early intervention relevant to the specific etiology. This case report is of a novel method of closure of midline diastemaorthodontically, but without extensive complete arch orthodontic treatment. This case presents a technique in which space between central incisors is closed by using orthodontic forces between central incisors itself.*

1. Introduction

A space between adjacent teeth is called a “diastema”. Midline diastemata (or diastemas) occur in approximately 98% of 6 year olds, 49% of 11 year olds and 7% of 12–18 year olds.1 The midline diastema of the teeth is often a normal or developmental occurrence, due to the position of the teeth in their bony crypts, to the eruption path of the cuspids, and to the increase in size of the premaxilla at the time of eruption of the maxillary permanent central incisors. Eruption, migration, and physiological readjustment of the teeth, labial and facial musculature, development into the beauty-conscious teenage group, the anterior component of the force of occlusion, and the increase in the size of the jaws with accompanying increase in tonicity of the facial musculature all tend to influence closure of the midline dental space. Since the frenum is considered a problem only if the teeth are separated, the effect of these natural forces is not only to close the midline dental space, but also automatically to eliminate the problem of the frenum. Relatively early in orthodontic literature, the superior labial frenum was listed as a cause of the midline diastema. Frenectomy was advised, and techniques for its removal were described. The number of frenectomies currently recommended by orthodontists is relatively small. Most of the respondents are treating the midline dental space Orthodontically without frenectomy. Often, people have a diastema treated for cosmetic reasons. They may be self-conscious about having a space between their teeth. However, a diastema also can affect speech. In cosmetic treatment, the direct-bonding restoration technique re - presents the preferred therapeutic option. It preserves maximal tooth structure and helps to restore function and aesthetics in only a few clinical visits. In addition, the technique is economical and the possible need for sophisticated indirect restoration can be postponed. Direct-bonding restorations demand excellent clinical skills. The clinician is required to incorporate various clinical techniques, tips and tricks.

2. Causes

- Genetic: midline spacing has a racial and familial background.
- Physiological: midline diastema may be considered normal for many children during the eruption of the permanent maxillary central incisors. When the incisors first erupt, they may be separated by bone and the crowns incline distally because of crowding of the roots. With the eruption of lateral incisors and permanent canines, midline diastema reduces or even closes (ugly duckly stage)
- Supernumerary teeth: The presence of supernumerary teeth and their effect on the developing occlusion has been investigated by numerous authors, but high proportion (38%) of patients with supernumerary teeth had delayed or failed eruption of permanent teeth, whereas inverted supernumeraries were more likely to be associated with bodily displacement of the permanent incisors, median diastema and torsi version.
- Abnormal frenum: A maxillary midline diastema is often complicated by the insertion of the labial frenum into the notch in the alveolar bone, so that a band of heavy fibrous tissue lies between the central incisors3. A simple test, blanching test was performed for an abnormal high frenum by observing the location of alveolar attachment when intermittent pressure was exerted on the frenum. If a heavy band of tissue with a broad, fan like base is attached to the palatine papillae and produces the blanching of the papilla.
- Tooth material – arch length discrepancy: condition such as missing teeth, microdontia, peg shaped laterals, macrognathia.If the lateral incisors are small or absent, the extra space can allow the incisor teeth to move apart and create a diastema4.
- Habits: Habits such as thumb sucking or tongue thrusting can cause procliantion of teeth, which causes midline diastema along with generalized spacing.
- Midline pathology: soft tissue and hard tissue pathologies such as cysts, tumors and odontomes may cause midline diastema.
- Iatrogenic: rapid maxillary expansion can cause midline diastema due to opening of the intermaxillary suture.
- Moyers stated that imperfect fusion at the midline of premaxilla is the most common cause of maxillary midline diastema.

3. Case Report

A 23 year old male patient reported to the department of Orthodontics and dentofacial Orthopedics atSinhgad dental college and hospital, Pune with the chief complaint of spacing between upper front teeth. The case was examined thoroughly intra orally as well as extra orally. There was a presence of midline diastema of 4mm between the central incisors. Frenal attachment was not high in this case, so there was no need for surgical intervention(frenecetomy). Maxillary and mandibular arches in this patient were well aligned, so the need for complete arch fixed orthodontic treatment deemed unnecessary in this patient. Hence we decided to employ a novel approach in this case in which only the upper central incisors were used to correct the midline diastema

- ***Method:*** Upper central incisors of the right and left side were bonded with MBT 0.022 inch sized brackets . A 0.17x0.25 inch TMA wire was cut into the length a little longer than the mesiodistal width of both the central incisors combined and both the ends of the TMA wire were bent to make sure it does not hurt or prick the intraoral mucosa of the patient. This TMA wire was engaged in the 0.022 inch bracket slot of the central incisors. The brackets were engaged with Short E chains and the patient was recalled after 3 weeks.
- ***Progress:*** After a period of 3 weeks, the patient was recalled to change the E chain and observe the progress in the closure of the midline diastema. It was observed that the midline space between the central incisors reduced from 4 mm to 2 mm within 3 weeks. The E chain was changed and this time continuous E chains were used as the space between the central incisors reduced. The patient was recalled after another 3 weeks.
- ***Results:*** After a period of 6 weeks right from the commencement of the treatment, there was complete closure of midline diastema, due to the forces applied by the E chains in 2 consecutive appointments spaced between 3 weeks interval. However it was observed that after a period of 6 weeks, minor spaces of 1.5 mm each, opened up between the central and lateral incisors of both right and left side. This was managed later on by composite build ups of lateral incisors which was permitted, given the small size of the lateral incisors, keeping the golden proportion in mind.

Pre Treatment

Post Treatment

4. Discussion

Before the Orthodontist can determine the optimal treatment, he or she must consider the contributing factors. These include normal growth and development, tooth size discrepancies, excessive incisor vertical overlap of different causes, mesiodistal and labiolingual incisor angulation, generalized spacing and pathological conditions.A carefully developed differential diagnosis allows the practitioner to choose the most effective orthodontic and/or restorative treatment. Diastemasbased on tooth-size discrepancy are most amenable to restorative and prosthetic solutions.The most appropriate treatment often requires orthodonticallyclosing the midline diastema. This clinical report presents a quick and simplified solution for median diastema and discusses the most relevant aspects related to its etiology and treatment planning. Occasionally a local cause must be identified and eliminated before the diastema can be closed orthodontically with a stable result. The ideal treatment should seek to manage not only the diastema in question but also the cause behind it. Aesthetic rehabilitation in complex diastema closure cases is guided by the principles of proportion. The width to length ratio of the centrals must be pleasing. Achievement of this proper balance dictates treatment.Direct bonding of central incisors in diastema closure cases allows the dentist and the patient completecontrol in the formation of that smile. Thistreatment modality is challenging andultimately rewarding for the patient and thedentist. Maxillary midline diastemas are a part of normal development in children. In growing patients, midline diastemas often appear during a transitory stage of development, and then close spontaneously. The great majority of diastemas closes after the eruption of the maxillary canine teeth and requires no intervention by the dentist. Only diastemas larger than 2 mm and diastemas in patients with generalized spacing are at risk of not closing with normal development. It is important for dentists to recognize this often abnormal-appearing maxillary dental arrangement and not treat what is, in fact, normal development.

5. Retention Protocol

Fixed lingual bonded retainer was delivered to the patient in the upper arch from canine to canine with the help of multistranded wire

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