

Case series

The multidisciplinary management of median diastema

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Abstract

Maxillary midline diastemas are a common esthetic problem that dentists must treat. Many innovative therapies have been used, varying from restorative procedures to surgery (frenectomies) and orthodontics. The importance of the presence of a maxillary midline diastema resides in its position and the concern it causes to patients. This specific diastema has been attributed to genetic and environmental factors, even though it is often a normal feature of growth, especially in primary and mixed dentition. The need for treatment is mainly attributed to esthetic and psychological reasons, rather than functional ones. Although it is often the case, treatment plans should not be selected empirically but rather should be based on adequate scientific documentation. This paper reviews different treatment techniques to manage the situation and presents three cases to illustrate a range of restorative, prosthetic and orthodontic options.

Keywords: Midline diastema, dental spacing, etiology, treatment, relapse.

Introduction

Maxillary anterior diastemas are a normal part of dental development. Spacing in the full primary dentition is normal and an indicator of space available for the eruption of permanent teeth. As the permanent maxillary incisors erupt, a diastema is frequently created and often persists throughout the mixed dentition until the canine teeth erupt. After the eruption of the central incisors, the lateral incisors erupt incisally along the central roots, tipping the central crowns distally and often increasing the size of the diastema between the central incisors. Only after the cuspids erupt down along the lateral incisor roots and finally into full occlusion does the maxillary midline diastema close.¹⁻³ Maxillary anterior spacing, or diastemas, are a common esthetic complaint of patients and their parents. Although a few entertainment celebrities have used a midline maxillary diastema as a successful trademark, many people find it esthetically displeasing. In fact, a recent study involving European adults found that patients with a broad midline diastema were perceived as being less socially successful and of lower intelligence.⁴ The esthetic importance of

maxillary anterior spacing varies both culturally and racially as well as with the incidence of diastemas within a given population.⁵ Median diastema may negatively interfere with the harmony of the smile, often requiring a multidisciplinary intervention. In mixed and early permanent dentitions, median diastema can be a major esthetic concern for patients and/or their parents. The space can be transient or created by developmental, pathological, or iatrogenic factors. In nongrowing adult patients, the situation is quite different. Possible therapeutic approaches include orthodontics, restorative, prosthodontics, surgery and various combinations of the above. Irrespective of the treatment alternative selected, permanent retention of stable results should be considered as a treatment objective.

Case presentations

Case 1

The patient presented to our clinic as a healthy postmenarcheal female with the chief complaint, "space between maxillary central incisors". The patient age was 20

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years. Her medical history was non-contributory. Dental histories include median diastema and maxillary high labial frenal attachment. All possible treatment modalities were discussed and light cure composite resin of appropriate shade was used to manage the median diastema. As patient and her parents deny removing maxillary high labial frenal attachment that's why it was leave as it is (Fig-1).

Case 2

This case concerns prosthodontic treatment of a 22 years old Bangladeshi female with median diastema and localized spacing (distal to the upper central incisors). Her medical history was non-contributory. Patient already had experience of dislodgement of light cure composite filling. She also denies having braces because of cost and lengthy procedures. Prosthodontic approach was discussed and treatment carried out with porcelain fused metal crown on upper two central incisors. Both the median diastema and the localized spacing were closed. Patient was highly pleased with the new appearance (Fig-2).

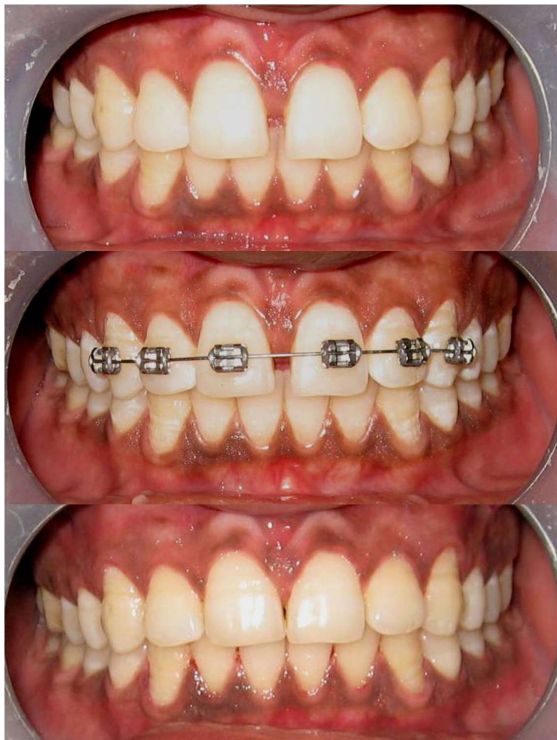


Figure 1: Restorative treatment of median diastema by light cure composite resin (pre and post treatment intraoral photographs).



Figure 2: Prosthetic treatment of median diastema by porcelain fused to metal crown (pre and post treatment intraoral photographs).

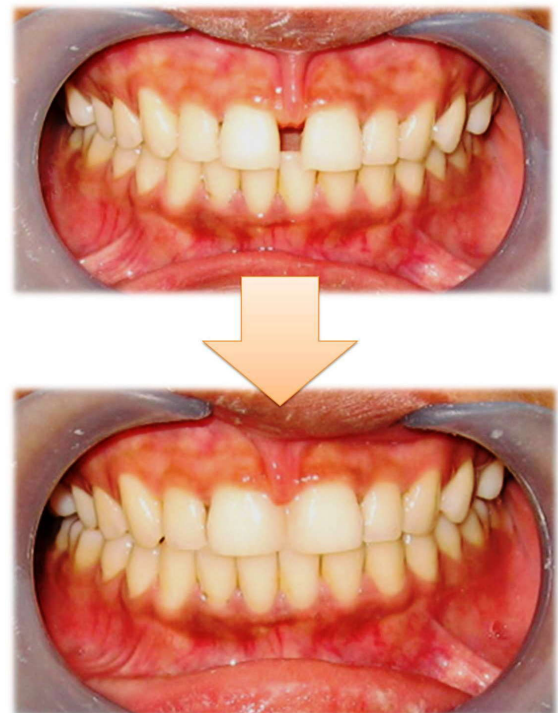


Figure 3: Orthodontic treatment of median diastema by preadjusted Roth type (018 slot) brackets (pre and post treatment intraoral photographs).

Case 3

Treatment was started in the maxillary arch (sectional technique) with preadjusted Roth type (018 slot) brackets. A 0.014 inch nitinol arch was used for leveling and

labial alignment of the maxillary anteriors. After leveling and labial alignment 0.016 inch SS wire was inserted to correct median diastema with the power chain, a 0.016 × 0.022 inch nitinol arch was inserted for the final alignment and detailing. Lastly a 0.016 × 0.022 inch stainless steel arch wire was used for the alignment stabilization. Median diastema closure was obtained after 2 and half months active fixed orthodontic treatment and after total 4 and half months, all the appliances were removed. Fixed lingual type retainer was set on the palatal surface of the maxillary anteriors prepared by coaxial wire and set by light cure composite (Fig-3).

Discussion

Before the practitioner 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.⁶ A carefully developed differential diagnosis allows the practitioner to choose the most effective orthodontic and/or restorative treatment. Diastemas based on tooth-size discrepancy are most amenable to restorative and prosthetic solutions.⁶ The most appropriate treatment often requires orthodontically closing the midline diastema. This clinical report presents an integrated orthodontic, prosthodontic, and restorative solution for median diastema and discusses the most relevant aspects related to its etiology and treatment planning. Furthermore, alternative treatment options are discussed depending on the etiology of the problem. 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.⁵ It determines the amount of distal proximal reduction; the decision to completely crown the incisors vs. just adding to the interproximal; the number of teeth to be treated; the placement and location of naturally occurring prominences and concavities to create the illusion of a narrower tooth. The proper accommodation of these four topics will permit the maintenance or restoration of acceptable dimensions in the centrals.⁵

Direct bonding in diastema closure cases allows the dentist and the patient complete control in the formation of that smile. This treatment modality is challenging and ultimately rewarding for the patient and the dentist. At times it enables us to restore form and function and to make our patients whole again not just figuratively but literally. 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. In adults, tooth-size discrepancies and excessive vertical overlap of the incisors are the most common factors in the development of diastemas. The great majority of diastemas closes after the eruption of the maxillary canine teeth and requires no intervention by the dentist.⁷ Only diastemas larger than 2 mm and diastemas in patients with generalized spacing are at risk of not closing with normal development.⁷ It is important for dentists to recognize this often abnormal-appearing maxillary dental arrangement and not treat what is, in fact, normal development.

Conclusion

The results achieved in these cases fulfill initial treatment objectives and may be

considered a success. From an esthetic perspective the patients and their parents were entirely pleased with the outcome of treatment.

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