Clinical Management of Midline Diastema

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ABSTRACT:

The presence of maxillary midline diastema is usually the part of normal dental development during mixed dentition which requires no active treatment. But the continuing presence of it in an adult is an esthetic problem. The effective treatment of midline diastema depends on the etiological factors, size and extent of diastema. There are various treatment options available for the closure of diastema depending on the clinical situation. This article presents three patients of midline diastema treated using two different clinical options.

Key words: Diastema closure, midline diastema, supernumerary teeth, Frenectomy.

Introduction

Midline diastema is defined as the space or gap between maxillary/ mandibular central incisors. Presence of midline diastema in an adult is often considered to be a malocclusion and an aesthetic problem.¹ Diastema can be a normal characteristic during primary and mixed dentition and generally gets corrected by the time maxillary canine erupt.² However in some cases midline diastema does not close spontaneously even after the eruption of permanent maxillary canine.³

The treatment modality and approach for midline diastema correction varies from case to case. Correct diagnosis of its etiology and subsequent treatment approach is essential for positive outcome. An interdisciplinary approach involving orthodontist, restorative dentist and maxillofacial surgeon is necessary in most of the cases to enhance the aesthetic and functional outcome.⁴

Figure 1: Correction of midline diastema with conservative composite build-up and recountouring of upper anterior teeth. (A) Pre Operative smile of patient. (B) Post-operative view after composite build up. (C) Preoperative intraoral view. (D) Post operative intra oral view.

Figure 2: Correction of midline diastema with conservative composite build-up (A) Pre Operative smile of patient. (B) Post-operative view after composite build up. (C) Preoperative intraoral view (D) Post operative intra oral view.

Figure 3: Preoperative view of patient showing spaces with anterior teeth. (A) Preoperative view of the patient during smile. (B) Intra oral view with teeth in occlusion. (C) Pre operative view of maxillary arch. (D) Orthopantomograph (OPG)

Figure 4: Post operative photographs of patient treated with fixed orthodontic mechanotherapy for diastema closure. (A) Orthodontic appliance in situ. (B) Post treatment intra oral view (C) Post treatment maxillary arch with fixed retention (D) Post operative extraoral view of the patient.

This article elucidate three cases of midline diastema treated successfully using either orthodontic or prosthodontic approach.

Case Reports:

Case Reports 1and 2:

The first two patients were adults, around 30-35 years old who came to the OPD at CMDC (WC), complaining of space between the front teeth and unaesthetic appearance. Intra- oral examination showed upper midline diastema measuring around 2-3 millimetre (Figure 1and 2). The overjet and overbite of the patient were within the normal range. The oral hygiene status and periodontal health were normal. After consulting the orthodontist and weighing the compliance/ motivational factor it was decided to take conservative approach. Composite resin restorations were done for both the patients, to which they gave their consent.

The restorations were done taking one incisor at a time. Shade matching of the tooth was done before starting any procedure. Acid etching was done using 37% phosphoric acid (Total etch, Ivoclar Vivadent) for 15 seconds after which the tooth was rinsed and air dried. A thin layer of adhesive was applied followed by the placement of composite resin (Synergy D6, Coltene) in small increments. The material was sculpted to the desired shape and light cured as per manufacturer's instructions. Finishing of restoration was done using finishing discs (Sof-Lex discs, 3M ESPE) for optimum results. The adjacent tooth was then built up in the similar manner to achieve the desired aesthetics. Mylar strips were used for the interproximal area during the composite build up.

Case Report 3:

A 20 year old female patient came to the dental centre with the chief complaint of spaces among front teeth. Clinical examination of the patient showed uneven spaces between maxillary and mandibular anterior teeth with excessive midline diastema of around 3 mm (Figure 3). The patient had well balanced face with no apparent asymmetry and intra- oral examination showed no midline shift

in both the arches. Orthopantomograph showed no supernumerary or unerupted teeth in either arch (Figure 3D). Analysis of all records i.e study models, lateral cephalogram and orthopantomograph were done and the problem list was made. The patient had tooth size arch length discrepancy (TSALD) and according to Bolton analysis there was mandibular anterior tooth material excess. The treatment plan consisted of therapeutic extraction of mandibular central incisor (31) and closure of the spaces using fixed orthodontic mechanotherapy. Patient/ parent consent was taken over the treatment plan.

Roth prescription (018") brackets were bonded to maxillary and mandibular teeth and after sequential use of archwires, spaces were closed using omega loops (Figure 4).

After the completion of orthodontic treatment fixed retention from canine to canine for both the arches was planned to prevent the relapse.

Discussion

There are many etiological factors in the development of a median diastema in an individual. According to Edwards the possible causes are a prominent labial fraenum, dentoalveolar disproportion, missing teeth, supernumerary teeth, proclination of the upper labial segment and pernicious habits.⁵ A study has also suggested the genetic susceptibility in the development of midline diastema.⁶ Let us enumerate the possible causes one by one:

Prominent labial fraenum:

It is believed that the prominent labial fraenum exerts distal pressure on central incisors making them separate leading to midline diastema. Angle in 1907, suggested its removal before treating this malocclusion, but many authors later suggested no correlation between midline diastema and labial frenum.^{7,8} Prominent and low frenum does exist in absence of diastema. Frenectomy and circumferential supracrestal fibrectomy may be necessary to prevent relapse in conjunction with orthodontic treatment.

Supernumerary teeth:

The presence of supernumerary teeth and their effect on the developing occlusion has been investigated by numerous authors. As suggested by many if supernumerary teeth were normally orientated, delayed eruption was likely to occur, whereas inverted supernumeraries were more likely to be associated with bodily displacement of the permanent incisors, median diastema and torsion.⁹

Malocclusions and other dental abnormalities:

Abnormal size and shape of the teeth, TSALD and missing teeth usually inhibit the approximation of incisors. Malocclusions like Angles Class II div I or Class I bimaxillary protrusion can lead to the diastemas between the teeth.

Pernicious Habits and muscular imbalances in the oral region:

The dentition is in balance or equilibrium among various forces from the intraoral and extraoral soft tissues. The muscular imbalances in the oral region can break this balance and cause the teeth to move until the forces reach a new equilibrium. Pernicious habits if prolonged can change the equilibrium of forces among the lips, cheeks, and tongue. Thumb sucking, tongue thrusting and lower lip biting habits causes the outward pressure on the dentition leading to flaring of anterior teeth, which leads to midline diastema.¹⁰

Treatment:

Correct diagnosis of etiology, its intervention or removal and timing of the treatment play a vital role in effective correction of midline diastema. Detailed medical and dental history, clinical and radiographic examination of both the jaws and tooth-size arch length analysis will bring us to a correct diagnosis.¹⁰ Treatment options can then be chosen according to the severity/ complexity of the case.

Conclusion:

Presence of midline diastema is a common aesthetic problem in adults. There are many innovative treatment procedures available varying

from restorative build up, porcelain veneers and orthodontic approach. Composite restorations are very conservative, less time consuming and mimic the natural tooth structure. Traditional porcelain laminate veneers, although provide an excellent aesthetic result; require removal of natural tooth structure. Direct composite restorations are preferable in cases having minor diastema to achieve fast aesthetic outcome. But for moderate to severe cases an orthodontic or multidisciplinary approach is essential for stable and aesthetic results. Patient's motivation and compliance factor should be kept in mind when opting for orthodontic correction due to its long duration.

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