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Case Report

Midline Diastema Closure Through Combined Orthodontic and Surgical Approach: A case report

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ABSTRACT

Midline diastema is a common aesthetic problem in mixed and permanent dentition. Many innovative therapies are available varying from restorative procedures such as composite build-up to surgery (frenectomy) and orthodontics. A high frenum attachment is often the cause of persistent diastemas. Presented herewith is a case report of a 20-year-old female with a high frenal attachment that had caused spacing of the maxillary central incisors. This case report demonstrates closure of midline diastema through fixed orthodontic appliance and removal of abnormal labial frenum attachment through surgery.

INTRODUCTION

Maxillary anterior spacing or diastema is a common aesthetic complaint of patients or parents and is frequently seen in the mixed and permanent dentition stage. Keene described midline diastema as anterior midline spacing greater than 0.5 mm between the proximal surfaces of adjacent teeth. He reported that the incidences of maxillary and mandibular midline diastema are 14.8% and 1.6%, respectively[1]. Maxilla had a higher prevalence of midline diastema than the mandible[2]. Taylor reported the incidence of midline diastema in 5 year olds as high as 97% and seen decreasing with age[3].

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 the crowding of the roots. With the eruption of the lateral incisors and permanent canines, the midline diastema reduces or even closes.

The causes for spacing between the maxillary incisors as: A result of high frenum attachment; microdontia; macrognathia; supernumerary teeth; peg laterals; missing lateral incisors; midline cysts and habits such as thumb sucking, mouth-breathing and tongue-thrusting. Not all diastemas can be treated the same in terms of modality or timing. The extent and the

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Figure 1: Pretreatment Intraoral Frontal View showing Midline diastema and high frenal attachment

Figure 2: Pretreatment Intraoral Occlusal View

etiology of the diastema must be properly evaluated. Proper case selection, appropriate treatment selection, adequate patient cooperation, and good oral hygiene all are important[4]. Associated high labial frenal attachment is the main etiological factor in this case report.

Therefore, the purpose of this article is to present a clinical case report of a 20 year old female with midline diastema in association with high labial frenal attachment treated by fixed appliance with labial frenectomy achieving satisfactory results.

CLINICAL REPORT

A 20-year-old Female reported to the Department of orthodontics and dentofacial orthopedics of People's Dental Academy, Bhopal with the chief complaint of spacing in the upper front region. Patient's medical history did not reveal any systemic diseases. Intraoral examination revealed presence of 7-mm midline diastema associated with high frenal attachment extending till the incisive papilla (fig 1 & 2) with Angle's class I molar relationship. To rule out the presence of any unerupted supernumerary teeth or any other underlying pathology intra oral periapical radiographs (IOPA) were advised. The radiographic findings revealed the absence of supernumerary teeth

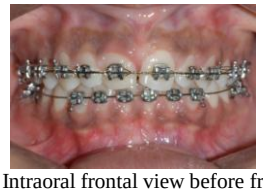

Figure 3: Intraoral frontal view before frenectomy

Figure 4: After frenectomy sutures placed

or any pathology. A simple diagnostic test, i.e., blanching test was performed for an abnormal high frenum by observing the location of the alveolar attachment when intermittent pressure was exerted on the frenum. If a heavy band of tissue with a broad, fanlike base is attached to the palatine papillae and produces blanching of the papilla, it is safe to predict that the frenum will unfavourably influence the development of the anterior occlusion. Blanching test was found positive in this case. Based on the clinical and radiographic findings the present case was diagnosed as Angle's class I malocclusion with midline diastema.

It was decided to close this large diastema of 7mm by bodily movement of central incisors with fixed appliance and frenectomy of high labial frenum. Minor attrition is seen on the incisal edge of central incisors but patient was not willing for composite build up. Edgewise brackets (0.022x 0.028 slot) were bonded and 0.014 round nickel-titanium wire was ligated for initial aligning and leveling. After initial aligning and leveling, anterior spaces were closed with e-chain. When less than 1mm space is left between central incisors frenectomy is done (fig 3 & 4). After frenectomy, remaining space is closed with e-chain canine to canine placed on the same visit.

Figure 5: Posttreatment intraoral frontal view after diastema closure

Figure 6: Bonded palatal retainer placed after space closure

Large midline diastema was closed completely in 6 months period. The brackets were then ligated by figure of 8 ligatures to maintain diastema closure. Intraoral periapical radiograph was taken, which revealed that the central incisor roots were almost parallel indicating a bodily movement of these teeth during diastema closure. Thereafter, direct bonded flexible lingual wire retainer was placed on palatal surfaces of anteriors. The brackets wire were then removed and photographs, IOPA and OPG radiographs, and study casts were obtained (fig 5 & 6). The final result was esthetically pleasing and hence, psychologically satisfying for the patient.

DISCUSSION

Diastemas are major esthetic concerns and hence, are an important reason for seeking orthodontic treatment for their closure by many patients. Midline diastema management depends upon their etiology. Habit breaking appliances are effective in treating diastemas attributed to finger-sucking or tongue thrust habits. Small diastemas can be closed by using removable appliances with finger springs[5,6]. Wider diastema needs closure by fixed appliance for correcting and controlling crown and root angulations and maintaining overbite control.[5,6,7] Prosthetic replacement of missing teeth and other restorative procedures like veneers, crowing and composite buildups are commonly used in patients with tooth size discrepancies or when such needs are necessary in other patients. These treatment modalities should be deferred till eruption of permanent canines[6]. Surgical procedures like frenectomy, interdental corticotomy and glossectomy have been proposed to treat high labial frenal attachments, large interdental alveolar septum or interdental alveolar cleft and large tongue respectively[6].

Removable appliances generally close diastemas by tipping the crowns of incisors. They do not provide effective vertical or torque control, which results in a strong tendency toward relapse[6]. Bodily movement of teeth can be possible by fixed appliances. Tipping can be minimized by v bend in the center of the wire giving in vertical plane[5,6]. However, better vertical and torque control of incisors can be achieved by 2x4 appliances or utility arch.6 For intrusion of extruded incisors a gentle curve of spee should be incorporated in the plain arch wire. As their is strong association between diastema and high frenal attachment, a good interdisciplinary approach by orthodontist and periodontist is beneficial for the patient for their management.

Midline diastemas have a strong tendency to recur after their closure[8]. Hence, a bonded retainer on the palatal surface of incisors is recommended[6]. Edwards[8] found diastema relapse in 84% of his sample with a strong correlation between labial frenum and diastema relapse. Another study found midline diastema recurrence in 60% of the sample with strong correlation of relapse with larger initial diastema width, relapse of overjet, and intermaxillary osseous cleft and concluded that midline diastema closure is highly unstable, hence needs lifetime wear of maxillary fixed retainer[9]. Inadequate root parallelism

at the end of treatment has also been cited as a reason for midline diastema relapse[8,10]. However, some mesial inclination of central incisor is preferred[9]. Presence of midline diastema in maxillary arch could be deleterious from esthetic and functional points of view. Hence these patients need prompt treatment.

SUMMARY

Large median diastemas cause psychological concerns among adults and require closure by movement of central incisors. Midline diastema associated with high labial frenal attachment requires closure of diastema with fixed appliance and to prevent relapse frenectomy should be done at ideal time.

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