CASE REPORT

MIDLINE DIASTEMA CORRECTION BY SURGICAL AND ORTHODONTIC INTERVENTION- A CASE REPORT

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ABSTRACT

Midline diastema is one of the most common aesthetic complaints in mixed and sometimes in permanent dentition stage. High frenal attachment is the major etiological factor causing midline spacing. Many innovative therapies such as composite build-up to surgery (frenectomy) and orthodontics are available[1]. A high frenum attachment is often the cause of persistent diastemas. Here presented with is a case report of a 13-year-old girl with a high frenal attachment that had caused spacing of the maxillary central incisors. This case report demonstrates the removal of the abnormal labial frenum attachment through surgery and subsequent closure of maxillary diastema following fixed orthodontic treatment.

KEY WORDS

Frenum, midline diastema, orthodontics

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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[1]. Keene described midline diastema as anterior midline spacing greater than 0.5 mm between the proximal surfaces of adjacent teeth. He reported that the incidence of maxillary and mandibular midline diastema are 14.8% and 1.6%, respectively[2]. Midline diastema may be considered normal for many children during the eruption of the permanent maxillary central incisors. The most common aetiologic factor of midline diastema is abnormal labialfrenum attachment. The other common causes for midline diastema include transient malocclusion, midline pathology, geneticpredisposition, supernumerary teeth (mesiodens), missing teeth, odontogenic tumours or cysts, tooth material and arch length discrepancy, abnormal tooth position and habits like thumb sucking, lip or finger sucking[3]. The maxillary labial frenum is a fold of mucous membrane which develops as post-eruptive remnant of the tectolabial band during intrauterine life and connects the tubercle of upper lip to the palatine papilla. Transient midline diastema may be seen in the ugly duckling stage[4]. After eruption of the permanent central and lateral incisors, the erupting permanent canines displace the roots of lateral incisors mesially resulting in transmission of force to the roots of central incisors which also get displaced mesially. This results in distal divergence of crowns of central incisors causing midline spacing. This phenomenon is called as Broadbent phenomenon or the ugly duckling stage.

CASE REPORT

An 13-year-old girl reported to the Department of Pedodontics and Preventive Dentistry of Dr R Ahmed dental college and hospital, Kolkata, West Bengal with the chief complaint of spacing in the upper front teeth region. Patient's medical history did not reveal any systemic diseases. An OPG (X-ray) was taken to find out the cause of diastema and to rule out the presence of any unerupted mesiodens.

Figure 1.Thick labial frenal attachment and midline diastema

Figure 2. Intra Oral View

Figure 3. Removal of thick frenal tissue

Figure 4. Sutures given

Figure 5. Fixed orthodontic treatment and space closed

Figure 6. End of treatment, space closed and improved esthetic

On intra-oral examination revealed presence of high frenal attachment and midline spacing between maxillary central incisors [Figure 1 and 2]. A simple diagnostic test, i.e., blanching test was performed for an abnormal high frenum by observing the location of the alveolar attachment.

First MBT brackets were placed in upper arch and then after obtaining informed written consent from the parents, decision was made to remove high frenal attachment by a surgical technique [Figure 3]. Frenectomy was carried out under local anesthesia with incision using No. 11 Bard Parker blade. Sutures were placed [Figure 4] and patient was advised to return after a week for suture removal.

After 2 weeks later of surgery 0.012″ upper NiTi wire was placed. After 3 weeks interval 0.016″ NiTi wire was placed [Figure 5]. Then 0.019″x 0.025″ NiTi wire was given for one month. After that 0.019″x 0.025″stainless steel wire was placed and elastic chain was given from upper right canine to left canine and space was closed between central incisors in 4 weeks. After 3 months later all the brackets and wire were removed and essix retainer was given for another 10 months. At the end a remarkable improvement in esthetics was observed due to closure of midline diastema [Figure 6].

DISCUSSION

It is normal to have a diastema in the early and late mixed dentition stages, but it eventually closes during further development. Midline diastema could be transient or it can occur due to morphology and attachment of frenum, midline pathology, genetic predisposition, supernumerary teeth (mesiodens), missing teeth, odontogenic tumours or cysts, tooth material and arch length discrepancy and oral habits[5,8]. The high frenal attachment was the major aetiological factor causing midline spacing. Treatment of diastema varies and it requires correct diagnosis of its aetiology and early intervention relevant to the specific aetiology. If the diastema is due to transient malocclusion, no treatment is usually initiated as it spontaneously closes after the eruption of permanent maxillary canines[6]. Management of midline diastema due to abnormal frenal attachment

involves orthodontic treatment and surgical management that is frenectomy. Orthodontic treatment alone may not provide stability if the underlying cause is due to abnormal frenum, therefore it can be combined with frenectomy to prevent relapse of midline diastema closure[7].This case report includes management of midline diastema by using frenectomy and orthodontic treatment both.

Normally, closing the space between the incisors is delayed until the permanent canines erupt, as their eruption tends to close the diastema. However, in this case, the permanent canines had already erupted, but there is persistent midline diastema, and thick labial frenum and high frenal attachment was etiological factor, hence surgical and orthodontic intervention is done.

Abnormal frenal attachment frequently necessitates surgical excision, either prior to the initiation of orthodontic therapy or following the completion of active orthodontic tooth movement.

Excision performed before orthodontic intervention offers the advantage of improved surgical access and visibility. However, performing frenectomy prior to orthodontic space closure may result in the formation of fibrous scar tissue, which can potentially hinder approximation of the maxillary central incisors. Conversely, frenal excision following orthodontic alignment can be advantageous, as the resultant scar tissue may contribute to the long-term stability of the inter-dental space closure by acting as a physical barrier against relapse[11].

According to Spilka and Mathews, despite high rates of clinical success in the correction of malocclusions, orthodontists continue to encounter difficulty in achieving stable results in cases involving midline diastema, which remains a region prone to relapse. Surgical management of diastema has been effectively implemented in conjunction with removable orthodontic appliances, particularly in patients not requiring immediate closure[12].

In the present clinical case, timely identification and elimination of the etiologic factor through frenectomy resulted in spontaneous diastema closure, with minimal intervention and reduced treatment costs. Moreover, this approach required limited patient compliance, highlighting the benefit of interceptive treatment. Early interception of developing malocclusion is essential for restoring optimal occlusion. However, the effectiveness of such intervention depends significantly on appropriate timing and individualized treatment planning, as demonstrated in the current case.

CONCLUSION

The present case emphasizes the importance of timely diagnosis and management of midline diastema associated with abnormal frenal attachment. Identification and elimination of the etiologic factor through frenectomy, followed by appropriate orthodontic intervention, ensured successful closure of the diastema and stability of the treatment outcome. This highlights the significance of interceptive treatment in preventing the progression of developing malocclusion and achieving functional and esthetic harmony. Moreover, proper timing and individualized treatment planning remain crucial in ensuring long term stability and optimal occlusal results.

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