

MIDLINE DIASTEMA MANAGEMENT, FOLLOWED BY FIXED ORTHODONTIC TREATMENT - A CASE REPORT

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ABSTRACT

Midline diastema is the most common cosmetically unpleasing malocclusion occurs in mixed and permanent dentition. It occurs mainly present in maxillary arch, rare cases of mandibular midline diastema has been reported. Cause of midline diastema are physiological (self-correcting) or pathological. In cases of high frenal attachment, Frenectomy is the surgical treatment option to remove the high frenal pull. After removing the cause, definitive treatment is required to space closure either by prosthetic or orthodontic rehabilitation required. Here presented the case report of 12yrs old girl with high frenal attachment which is the cause of diastema measure about 3mm. The patient underwent a frenectomy, and after 2 months, there was a 1 mm reduction in the diastema. Following that, the 2 mm gap was corrected using fixed orthodontics and a bonded lingual retainer was applied. Follow up done after 8 months.

KEY WORDS

Diastema, frenectomy, fixed orthodontics, lingual retention, follow up

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INTRODUCTION

A space (or gap) between the maxillary central incisors is known as the midline diastema¹. Diastema, which is Greek for "interval," is the void or space between two or more adjacent teeth. It is known as the median, central, or midline diastema because it more typically develops between the two central incisors in the middle plane of the maxillary arch^{2,3}. Maxillary midline diastema is a normal growth characteristic during the primary and mixed dentition and the gap is often closed by the time maxillary canines erupts¹. Maxillary midline diastemas often affect 50% of kids between the ages of 6 and 8, but get reduced and so much less common when children grow older. At this age, females are more prevalent, but by age 14, males are more prevalent⁵. There is many reason behind the cause of midline diastema. They can be both physiological and pathological conditions. Proper diagnosis is required to provide the definite treatment of diastema cases. Radiographic investigations are a must to find out the cause of diastema. Treatment planning depends on the thickness of the frenum, age of the patient. Fixed appliances are recommended for correction in adults with broader diastemas to regulate crown and root angulations⁶. Maxillary median diastema's aetiology, pathophysiology, and diagnosis all have been the topic of considerable controversy over the years. Main controversy about the frenectomy treatment concern about before or after the fixed orthodontic treatment. This case report is about management of midline diastema, frenectomy followed by fixed orthodontic treatment.

CASE REPORT

A 12-year-old girl visited the Dr. R. Ahmed Dental College and Hospital in the Paediatric And Preventive Dentistry Department. She complains of gap in between her upper front teeth and prefers to always wear a mask because she is self-conscious about the gap in her teeth. She is embarrassed to smile and click photos. The medical history and dental history of the patient were found to be non-significant. On extra-oral examination the patient had a straight profile, a mesochepealic head type, a

mesoprosopic face type, competent lips and a horizontal growth pattern. During smile examination, the space between the maxillary central incisors is present. Intra-oral examination revealed presence of high frenal attachment and midline spacing between maxillary central incisors (3 mm). (Fig- 1)

A vernier calliper was utilised to measure the interdental distance that present between the maxillary centrals. (vizbrite stainless steel electronic vernier calliper). Blanch test is positive indicating high frenum for this patient. 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.⁷

TREATMENT PLAN

The treatment objective was to treat the patient's mid line diastema. Major etiology for this patient is aberrant frenum. Generally frenectomy is performed during finishing stage of fixed orthodontic treatment or after orthodontic treatment. According to many studies after the frenectomy, scar tissue impedes the

tooth movement. But in this case, patient is in growing stage so there is a chance of self diastema closure after the removal of cause by the reference of article.^{8,9} So frenectomy was performed first.

To remove plaque and calculus from the teeth surface, a full-mouth oral prophylaxis was performed in the beginning of the case.

Armamentarium required for frenectomy are haemostat, scalpel blade no.15, gauze sponges, 4-0 black silk sutures, suture pliers, scissors, and a periodontal dressing (coe-pak). 2% lignocaine and 1:80000 adrenaline was locally injected to anaesthetize the frenum. The haemostat was inserted deep into the vestibule to engage the frenum, and incisions were made on its upper and lower surfaces until haemostat was free. The triangularly resected piece of the frenum with the haemostat was then removed. Using 4-0 black silk interrupted sutures done, the edges of the diamond-shaped wound were stitched securely and periodontal pack placed in the area. Additionally, the patient was instructed on charter's technique for effective plaque control and instructed to rinse her mouth with a 0.2% chlorhexidine gluconate mouthwash.



Fig 1



Fig 2



Fig 3



Fig 4



Fig 5



Fig 6



Fig 7



Fig 8

Post-operative antibiotic coverage was given along with analgesics for 3 days. The healing was without complication, and the sutures removed after ten days later.

Periodical observation was done for 2 months 1mm reduction of midline diastema was noticed on 1st month. On 2nd month there is no reduction of diastema, so on the 3rd month fixed orthodontic space closure was planned. Molar bands were placed in upper right and left first molars. MBT brackets were placed in upper jaw, initial levelling and alignment done for first 3 months using nitinol arch wire. (0.016 NiTi, 17x25 NiTi, 19x25 NiTi) (Fig-3a, 3b)

After leveling and labial alignment 16x 22inch ss wire placed to correct median diastema with the e-chain (short) (fig-4) . 0.016 × 0.022 inch Nitinol arch placed for the final alignment and detailing. At the end phase of treatment 19x25 inch stainless steel arch wire placed for the alignment stabilization for 2month (fig-5). Midline diastema closure was observed after 6 months of fixed orthodontic treatment. MBT brackets were deboned using debonding pliers and oral prophylaxis and tooth polishing done (fig-6).

Fixed lingual retainer placed using composite (fig-7) OPG was taken to analyse the root positioning & follow up is done for every two months (fig-8)

DISCUSSION

The most frequent type of malocclusion is a midline diastema, which can occur in both normal and pathological conditions. Midline diastema is easy to treat but difficult to retain. During mixed dentition, diastema can be seen in physiological developmental

stage. This is caused due to the eruption pressure of permanent canine exerted on the root of lateral incisors causing flaring of central incisors resulting in diastema. This stage called as ugly duckling stage. It spontaneously closes after the eruption of permanent maxillary canines nearly around 11-12 years. Parents are very much concern about the diastema of kid at this stage. Pedodontists or other dental specialities should reassure them and explain this as self-correcting anomaly to the parents. Before planning for the treatment, first we have to rule out the cause of the midline diastema. A carefully 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 solutions³. The most appropriate treatment often involves orthodontically closing the midline diastema.

Aesthetic rehabilitation in complex diastema closure cases is guided by the principles of proportion⁹. The width to length ratio of the centrals must be pleasing. Achievement of this proper balance dictates treatment¹⁰. Generally abnormal frenal attachment may require removal either before orthodontic treatment or at the end of active treatment. The advantage of excision prior to orthodontic treatment is the ease of surgical access¹¹. There are conflicts of opinion over whether to do a frenectomy before or after an orthodontic space closure. One of the study has stated that, some midline space closure is seen after a frenectomy without orthodontic treatment¹². Koora et al. published a case report spontaneous closure of midline diastema following frenectomy without any space closure treatment, they stated that if aberrant

frenum is the cause of the diastema, removal of the frenum make the space closure by itself because of eruption of the posterior teeth cause mesial migration utilizing the diastema space of a child in the growing stage. But treatment of diastema before the eruption of canine is not indicated. Al-najjim recommended frenectomy before commencing closure of median diastema, especially where the frenum is thick and bulky¹³. Bergstrom k is suggested that the frenum resists mesial pressure, and frenectomy before orthodontic closure could lead to faster tooth movement.¹⁴ In this present case also we saw 1mm reduction of diastema in 2 months. American Academy Of Paediatric Dentistry also advised that frenectomy should be accompanied by orthodontic space closure and is not recommended before the eruption of permanent canines¹⁵. James ga suggested that the correct positioning of the central incisors is done when the diastema is closed. In literature controversy has been reported about the frenectomy. Some authors suggested frenectomy before the orthodontic treatment impede the tooth movement due to the formation of scar tissue. there is no clear cut idea about the ideal timing of the frenectomy.

Closure of midline diastema can be done by either prosthetic (crown, composite) or orthodontic rehabilitation but retention is the key for midline diastema treatment modality. Although risk factors for relapse of median diastema have been discussed in some studies, the nature of relapse was unpredictable for individual patients. It is impossible to say how much time is needed for orthodontic retention¹⁶. Midline diastema is easy to treat but difficult to retain. Therefore bonded retainer and long term follow up required for diastema patient.

CONCLUSION

Management of midline diastema require the knowledge about the identifying the cause of diastema. After identifying the cause, proper treatment planning is required. In case of aberrant frenal attachment blanch test have to done. Midline diastema is easy to correct but difficult to retain. A long term follow up with lingual retainer is required for a successful treatment.

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