

Pre Orthodontics Frenectomy: Flip side of the coin- A case report

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ABSTRACT

Maxillary midline diastema is a common aesthetic problem in mixed and early permanent dentitions. The space can occur either as a transient malocclusion or created by developmental, pathological or iatrogenic factors. Many innovative therapies varying from restorative procedures such as composite build-up to surgery (frenectomies) and orthodontics are available. Although literature says every frenectomy procedure should be preceded by orthodontic treatment, we opted for frenectomy technique prior to orthodontic intervention with a null hypothesis to test the other side of the coin. Presented herewith is a case report of a 27-year-old Female with a high frenal attachment that had caused spacing of the maxillary central incisors. A closure of the midline diastema was noted within 6 months following frenectomy & adjunct orthodontic treatment.

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I. INTRODUCTION

Frenum is a band of mucous membrane which is triangular in shape consisting connective tissue, muscle fibres and attaches the lip to the alveolar mucosa and/or gingiva. In infants it extends over the alveolar process and form a raphe that reaches the palatal papilla. Eruption of teeth and growth of alveolar process changes its configuration to adult form.^[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 incidences of maxillary and mandibular midline diastema are 14.8% and 1.6%, respectively. The transient form of midline diastema which is usually seen in ugly duckling stage is normal in 98% children of age group between 6 and 7 years while this incidence decreases to only 7 % in persons 12-18 yrs old.^[2] But in some instances the infantile arrangement is retained as persistent midline diastema in adults which is generally due to high coronal attachment of frenum. The commonest location of frenum attachment among children with lower midline diastema is at the mucogingival junction (86%), whereas with upper midline diastema to gingival region (50%). It was concluded that the maxilla had a higher prevalence of midline diastema than the mandible.

The persistent midline diastema in adults is considered not only as an esthetic problem but it also leads to functional disturbances which are needed to be corrected by an interdisciplinary approach. The midline diastema is a space (or gap) between the maxillary central incisors which are considered normal growth characteristic during the ugly duckling stage and generally it closes eventually as maxillary laterals and canine like cases such as aberrant frenal attachment, V shaped midline bony clefts, etc.

Depending upon the extension of attachment of fibres, frena have been classified as [4]

1. Mucosal – when the frenal fibers are attached up to mucogingival junction.
2. Gingival – when fibers are inserted within attached gingiva.
3. Papillary – when fibers are extending into interdental papilla; and
4. Papilla penetrating – when the frenal fibers cross the alveolar process and extend up to palatine papilla.

Among these four types, papillary and papilla penetrating frena are considered as pathological and aberrant frenal attachments in clinical scenario and have been found to be associated with loss of papilla, recession, diastema, difficulty in brushing, alignment of teeth and psychological disturbances to individual [5,6]

Aberrant frena are detected visually, by applying tension over it to see the movement of papillary tip or blanch produced due to ischemia of the region.^[7] According to Miller, frenum should be considered as pathological when it is unusually wide or there is no apparent zone of attached gingiva along the midline or the interdental papilla shifts when the frenum is extended.^[8] However, a diastema can also affect the speech, thereby certain sounds like "S" is not pronounced properly. During this the tongue pushes forward to close the space thereby a constant tongue pressure can make the diastema worse over time.

In such cases, it is necessary to perform a frenectomy for aesthetic, psychological and functional reasons. There are some clinical situations in which a maxillary labial frenectomy is indicated¹⁰⁻¹²

1. To avoid a relapse of an orthodontically treated maxillary diastema;
2. In cases with a too short labial frenum, which creates problems in upper lip movement, speech etc;
3. To avoid gingival recession due to tension created during the normal oral function
4. To facilitate lip lengthening procedure;
5. To allow effective tooth brushing in the area of the frenum
6. When a maxillary labial frenum prevents the installation of a removable denture;
7. In rare occasions, for aesthetic reasons.

II. CASE REPORT

A 27 year old female patient visited the department of orthodontics with a chief complaint of and spacing between anterior teeth with respect to 11 and 21. On clinical examination patient had midline diastema with a high frenal attachment with a positive tension test and a

high smile line with negative periodontal findings. The low attachment of fleshy maxillary labial frenum is often associated with midline diastema and has the following characteristics:

1. A frenum, which is unsightly, being visible as a pendulous piece of tissue in the midline of the upper lip.
2. Its presence precludes maintenance of good oral hygiene.
3. Where there is a direct attachment of the frenum at the gingival margin, it might increase the rate of periodontal destruction in the presence of pre-existing periodontal disease. This was confirmed by positive indication of the blanching test.

On radiographical examination there was no mesiodens and no alveolar bone loss but positive for cleft in the intercrestal bone (notching) with respect to 11 and 21. (Figure 1)

The case was then referred to department of periodontology for frenectomy prior to orthodontic treatment. Frenectomy was planned with respect to 11 and 21 after thorough periodontal phase I therapy. After anesthetizing the area, frenum was held high in position using artery forceps and frenectomy was performed (Figure 2) using conventional scalpel technique as it has better healing when compared to electrocautery and laser¹³ with no. 11 blade, direct sling sutures were placed (Figure 3) and kept under antibiotics, Amoxicillin 500mg TID for 5 days and non-steroidal anti-inflammatory drug Aceclofenac BID for 3 days and oral hygiene instructions were given. Patient was reviewed after one week, as healing was uneventful suture removal was done (Figure 4) and referred back to department of orthodontics for further treatment.



Fig 1: Pre-operative



Fig 2: Frenectomy done



Fig 3: Sutures placed



Fig 4: Healing after 1 week



Fig 5: After orthodontic treatment

Patient was referred back to department of periodontics for gingivoplasty after completion of orthodontic treatment. (Figure 5). Gingivoplasty was performed by conventional scalpel technique to prevent delaying wound healing by unwanted lateral heat damage¹³ and continuous incisions (Figure 8) after marking the bleeding points (Figure 6 & 7) with pocket marker and the tissue was excised. (Figure 9 & 10) Periodontal dressing was placed (Figure 11) and patient was prescribed antibiotics (Amoxicillin 500mg TID for 5 days) and NSAID's (Aceclofenac BID for 3 days). Patient was recalled after one week, Healing was uneventful and gingival contours were established according to the tooth form hence periodontal dressing was removed and saline irrigation done. (Figure 12)



Fig 6: Marking of bleeding points



Fig 7: Bleeding points marked with pocket marker



Fig 8 : Continuous incisions placed



Fig 9: Tissue excised



Fig 10: Excised tissue



Fig 11: Periodontal dressing placed



Fig 12: Post operative

III. RESULTS

The outcome of this surgical procedure shows this technique produced a pleasing aesthetic result. On healing a wider zone of attached gingiva was obtained. It was color matched with adjacent tissue. Healing was obtained by primary intention. No loss of interdental papilla was observed. No complication was noted during healing period. Patient's compliance was also very good.

IV. DISCUSSION

High frenal attachment can lead to gingival recession due to the tension on the tissues during normal functions, such as speaking, chewing, and laughing⁹⁻¹². It prevents the closure of space between the maxillary central incisors leading to persistent midline diastema and also creates an area for food impaction and difficulty in performing oral hygiene procedures⁹⁻¹⁰ resulting in poor oral hygiene and subsequently to inflammatory periodontal destruction. Esthetically it results in high smile line^[12] affecting the lip movement.

V shaped midline bony clefts interrupts with the formation of transseptal fibers and is one of the main reasons for relapse of orthodontic treatment.¹⁴ Other factors include oral habits, soft tissue imbalances, physical impediments, dental anomalies and/or dental/skeletal disharmonies, as well as normal dentoalveolar development [11, 15-20].

Aberrant labial frenal attachments are also the foremost reason to functional and esthetic problems such as maxillary midline diastema and malocclusion because bulk of frenum fibers retaining their embryological connection with the incisive papilla physically prevent approximation of central incisors.^[21-22] & also the fibers will interrupt with periodontal ligament fibers (transseptal fibers) between central incisors resulting in a weak link in the arch^[23] resulting in pathological migration^[12] at most times.

Etiology and accurate diagnosis and intervention based on these factors helps in effective treatment of diastema and can prevent mucogingival problems and also creates a maintainable state of oral hygiene. Interdisciplinary approaches by orthodontic and periodontic procedures help in resolving various esthetic and malocclusion problems. Over the years there has been controversy about the type of frenal attachments which are aberrant leading to malocclusion and esthetic / periodontal problems and also about the right timing of frenectomy to

eliminate such problems. Various authors suggested different schools of thoughts about removal of aberrant frenal attachments before, during and after orthodontic treatment followed by permanent retention to prevent relapse.

Some authors support the view of early removal of the fraenum, which helps in diastema closure without any obstacles. Other authors support diastema closure first and then frenectomy with the hope of resulting scar tissue healing holds the teeth stronger to prevent relapse. A third group of clinicians rarely considers frenectomy procedure and choose to combat the definitely relapse of closed diastema with fixed permanent bonded retainers on two central incisors.¹⁰

In our case, frenectomy was performed before orthodontic treatment by Edwards^{16,25} technique which consists of

- 1) apically repositioning of the frenum (with exposure of alveolar bone),
- 2) Destroying the transseptal fibers in the interdental zone of the central incisors, and
- 3) Excising excessive frenal tissues.

A frenum is evaluated in relation to vestibular depth, zone of attached gingiva, interdental papilla and diastema. If there is an adequate zone of attached gingiva, coronal to the frenum, it is of no clinical significance. A zone of attached gingiva is considered to prevent recession and it also gives an aesthetically pleasant appearance.

The advantage of an early excision prior to orthodontic treatment is the ease of surgical access.²⁶ whereas Access to the surgical procedure is more limited after orthodontic closure and will not be possible to remove all residual fibrous tissue thoroughly from the interdental suture area. After completion of orthodontic treatment, gingivoplasty was performed to establish gingival contours to create convenience while performing oral hygiene procedures which is necessary to maintain the periodontal health.

V. CONCLUSION

Although there are lots of controversies in the timing of doing frenectomy for the closure of midline diastema by orthodontic treatment, in this case we have obtained proper space closure even when frenectomy was done prior to orthodontic treatment. This method has certain distinct advantages e.g.-

1. Healing takes place by primary intention.
2. A zone of attached gingiva, matching with adjacent tissue, forms in midline which is pleasing to the individual.
3. No unesthetic scar formation.
4. No recession of interdental papilla occurs because the transseptal fibres are not severed out.

5. The attached gingiva in midline may have a bracing effect which helps in prevention of orthodontic relapse.

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9.	Tissue excised
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11.	Periodontal dressing placed
12.	Post operative

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Not Applicable

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