Closure of Midline Diastema through Fixed Orthodontic Treatment and Periodontal Surgery Combination: Case Report

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Abstract

Spacing is a common complexity, can be seen in both maxillary and mandibular arches or between any tooth which has to be corrected to bring out the perfect smile for which everyone aims. Spaced dentition is characterized by interdentally spaces and lack of contact points .Spacing can be both localized or generalized type due to number of teeth involved. Maxillary midline diastema is a common aesthetic problem which needs a definite treatment. This case report highlights the treatment of a patient with a midline diastema by using a combination of both fixed orthodontic mechanotherapy and frenectomy procedure. A 18-year-old male patient, whose chief complaint was a spacing between upper and lower central incisors, had a symmetric face and competent lips. Intraoral examination showed class 1 molar relationship bilaterally with decreased over jet. For the closure of midline diastema, fixed orthodontic therapy followed by here frenectomy is done.

Keywords: Fixed orthodontic, Midline diastema, periodontal surgery, spacing, retention

Introduction

Space closure in anterior segment of the jaws, has been a major challenge in dentistry.[1] Diastema between anterior teeth or generalized spacing may be caused by various factors which can be physiological or dent alveolar or caused due to missing a tooth, peg shaped lateral, midline supernumerary teeth, due to the position of the teeth in their bony crypts, wrong eruption pathway of the cupids, and due to the increase in size of the premaxilla, proclamation of the upper labial segment, prominent frenum and due to a self-inflicted pathology by tongue piercing.[2,3,4] Approximately 98% of 6 year olds, 49% of 11 year olds and 7% of 12–18 year olds has midline diatoms.[5] The treatment options involves observation and follow up, active orthodontic tooth movement, combined orthodontic and surgical approach, restorative treatment and Mulligan's technique of overcorrection.[5] In younger patients, space closure is easy and can be done by orthodontic treatment alone. Keene described greater than 0.5 mm spacing between the proximal surfaces of adjacent teeth midline diastema as anterior midline spacing, also reported the incidences of maxillary and mandibular midline diastema are 14.8% and 1.6%, respectively.p6] Maxilla had a higher prevalence of midline diastema than the mandible. Angle concluded the cause for midline diastema is an abnormal frenum and this view was supported by other researches. [7] Here, a case of spontaneous closure of midline diastema after frenectomy with fixed orthodontic appliances is presented.

Case Report

A 18-year-old male reported to the Department of Orthodontics and Dent facial Orthopedics Rama Dental College, Hospital & Research Centre, Kanpur with a chief complaint of spacing in the upper and lower front tooth region.

On intraoral examination there was minimal spacing in the upper and lower arch along with a 4mm of midline diastema in upper arch, Angles class I molar relationship bilaterally with slightly decreased over jet.

On extra oral examination, patient had a Mesoprosopic facial form with a slightly straight facial profile.There was neither gross asymmetry nor any facial disproportion.

On smile analysis, the amount of incisor exposure was 100 %, with 2 mm of gingival exposure. On an average the smile line was high with a consonant smile arch. His upper and lower lip length was normal with a 0 mm of interglacial gap.

Hard tissue examination,

- Dentition: Permanent
- Teeth present - All teeth are present in the upper and lower arch except third molars of 1 quadrant
- Shape of teeth: normal
- Size of teeth: normal
- Texture of Enamel: normal
- Dental arch: U shape maxilla/mandible

Vertical Relationship

- Open bite: Nil
- Overbite: 2 mm

Antero-posterior

- Over jet: 1 mm

Transverse Relationship

- Cross bite: Nil
- Scissor Bite: Nil
- Midline: coincide

Tests done for the renal attachment: Blanch test was done to confirm the diagnosis wherein the upper lip was stretched upward and outward showed an apparent zone of attached gingival along the midline/ the interdentally papilla shift, indicating papilla penetrating renal attachment.

Figure 1: A, profile view, B, profile view with smile, C, lateral view, D, oblique view

Pre-Treatment Extra oral Photographs

Pre-Treatment Intraoral Photographs

Figure 2: A, profile view, B, C, maxillary occlusal view, C, D lateral view

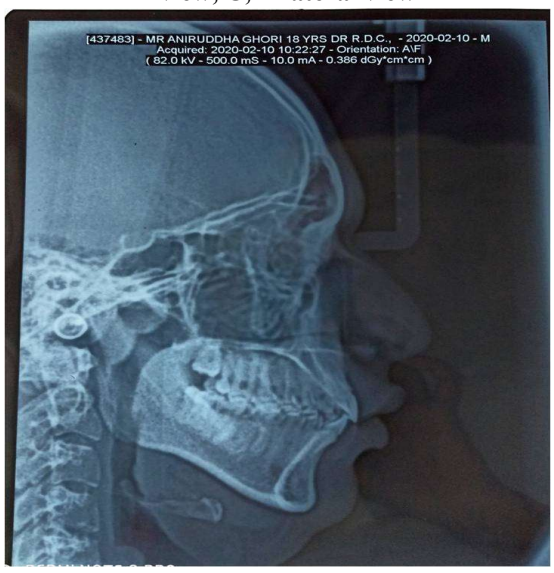

Figure3: Pre-treatment radiographs, A, lateral cephalogram; B, OPG

Figure4: Pre-treatment models

Table 1: Cephalo metric values

Measurement	Pre treatment
SNA	84 deg
SNB	79 deg
ANB	5 deg
FMA	30 deg
Jara backs ratio	60%
Lower 1 to N-B (mm.)	8 mm
Upper 1 to N-A(mm)	4 mm
IMPA	95 deg
Wits- appraisal (Ao-Bo)	5 mm

Diagnosis

It's a case of skeletal class II Jaw base relationship with pragmatic maxilla and orthographic mandible, vertical growth pattern and Angle's class I molar relationship bilaterally with spacing in upper and lower arch along with 4mmof midline diastema and high frenal attachment.

Treatment Objective

Skeletal: To correct class II relationship

Dental:

In The Maxillary Dentition:

- To correct axial inclination and align the teeth in the arch.
- Consolidation of space
- Correction of midline diastema

In the Mandibular Arch:

- To achieve a normal axial inclination, align the teeth in the arch.
- Consolidation of space

Soft Tissue Profile:

- To achieve a pleasing and harmonious profile
- Enhance facial esthetics
- To maintain the lip competency

In Occlusion:

- To achieve the normal over jet and overbite
- To maintain class I molar relation
- To maintain class I Canine relation

Treatment Plan

Fixed mechanotherapy with non-extraction treatment modality. Where Space closure will be done by continuous arch mechanics in both upper and lower arch followed by maxillary frenum removal by frenectomy. Readjusted edgewise appliances 0.022×0.028 slot (MBT prescription) will be bonded to the maxillary and mandibular arches. Anchorage preservation by Tran's palatal arch in upper and lingual arch in lower arch, Lace backs bend backs. Levelling and alignment using 0.014NiTi 0.016 NiTi, 0.016 SS, 0.018 SS, 0.017x0.025 NiTi, 0.017x0.025 SS,0.019X0.025 NiTi, 0.019 x 0.025 SS.Use of E-chain for the space closure.Consolidating the lower incisors as a unit and placing a hook distal to lateral incisor and retraction using active tie back on 0.019x 0.025 SS.Finishing and settling using 0.014niti. Retention using lingual bonded retainer in upper and lower arch.

Treatment Progression

Bonding in upper and lower teeth till 2nd premolars, anchorage preservation by transpalatal arch in upper and lingual arch in lower arch, Lace backs & bend backs, Leveling and alignment using 0.014NiTi 0.016 NiTi, 0.016 SS, 0.018 SS, 0.017x0.025 NiTi, 0.017x0.025 SS,0.019X0.025 NiTi, 0.019 x 0.025 SS.Both the arches were prepared for retraction with posted 0.019×0.025 stainless steel wire followed by 0.018 RCS with respect to lower arch. In upper & lower arch en mass retraction was carried out by using continuous arch mechanics.

After obtaining the result a decision was made to remove high renal attachment by a surgical technique, a written consent was taken from the parents and patient for the frenectomy procedure. After 10 days of the surgical procedure again a bonded lingual retainer along with haw leys retainer in upper and lower arch were delivered. And this whole treatment procedure was finished within a 11 months of time period.

At the end of treatment, a optimum over jet and overbite was obtained along with closure of midline diatom and midline shift. A consonant smile was established by maintaining a proper class l molar and canine relation.

Post Treatment Intraoral Photographs

Figure 5: Frenectomy Procedure

Figure 6: A, profile view, B, lateral view with, C, profile view with smile view

Figure 7: A,profile view, B,C lateral view

Overall, post treatment results showed significant improvement in facial profile and smile aesthetics.

Discussion

A common aesthetic problem faced in adults is spacing between teeth. Spaced dentition is characterized by interdentally spaces and lack of contact point's .Spacing can be both localized and generalized type due to number of teeth involved. The characteristic feature of mixed dentition is the presence of spacing mainly in the anterior segment, which usually is corrected by the termination of mixed and beginning of permanent dentition. The frenal attachment can be of different types, including mucosal, gingival, and papillary and papilla penetrating. It has been stated that when the remaining teeth erupt by 16 years of age, 83% of the maxillary midline diastemas disappear spontaneously.[8] Chances of relapse occurs after treatment of small initial diastema[9], measures must be taken to avoid relapse. Bonded lingual retainers are easily favoured by patients and are nondependent of patient cooperation. [10], In general; abnormal frenal attachment may require removal either before orthodontic treatment or at the end of active orthodontic treatment. The advantage of excision prior to orthodontic treatment is the ease of surgical access. Performing surgery before the orthodontic procedure might impede the closure of diastema by forming a scar tissue, but there is major advantage of excision after orthodontic tooth movement, which helps to maintain closure of diastema.

Conclusion

The present case report showed the presence of a thick frenum in the maxillary arch causing midline diastema and aesthetic problem in the patient and also there was a discrepancy in the arch length and total tooth material, which was corrected by a non extraction orthodontic treatment modality along with a frenectomy procedure. A correct diagnosis and early intervention of etiology is always necessary for a proper treatment plan.

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