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Orthodontic Management of a Maxillary Midline Diastema using Beggs Mechanics - Case Report

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ABSTRACT

Maxillary midline diastema with high frenum attachment has negative impact on aesthetics and function. The purpose of this article is to describe a case report of young female with a large midline diastema and torsi version of central incisors treated with orthodontic approach.

CASE DESCRIPTION: After orthodontic diagnosis, treatment undertaken was the surgical removal of the high frenum attachment in maxillary arch. Then, orthodontic Beggs brackets were bonded on maxillary anterior region and the diastema closed by using E chain along with upright springs. After complete diastema closure orthodontic treatment was discontinued. Then, permanent retainer was bonded on palatal aspect of maxillary anterior region. This technique of using round wire to close diastema using up righting springs has less inventory and reduces relapse.

Clinical Relevance: Managing midline diastema with this simplified Beggs mechanotherapy is an effective tool to assure good results.

KEYWORDS: *Midline diastema, Beggs brackets, round wire, uprighting springs*

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INTRODUCTION

Midline diastema is a common aesthetic problem in permanent dentition.[1] The space can occur either as a transient malocclusion or by developmental, pathological factors. Many innovative therapies are available from restorative procedures such as composite build-up to surgery (frenectomies) and orthodontics. Among these procedures each one has its pros and cons. Orthodontic correction using fixed appliance has additional advantages over restorative one. [2]

The case presented describes young female patient complained about the appearance of her maxillary anterior teeth because of a large midline diastema associated with high frenum attachment. This case report demonstrates an orthodontic approach for the correction of large maxillary diastema.

CASE DESCRIPTION:

20 years old female patient reported to Orthodontics department with the chief complaint of midline spacing in the upper front teeth.

Extra oral examination the patient revealed a straight profile and mesocephalic head type and mesoprosopic facial type with the incompetent lips (fig.1). Intraoral examination revealed midline spacing of 4 mm in relation to 11 and 21 associated with torsi version (fig.1). Patient had Angle's class I molar relation on both left and right side, Class I canine relation on both left and right side with overbite of 4mm and over jet of 5mm.

DIAGNOSIS:

Angle's Class I malocclusion with class I skeletal base with maxillary midline diastema.

TREATMENT OBJECTIVE:

To close maxillary midline spacing maintaining class I molar relation and class I canine relationship.

TREATMENT PLANNING:

After orthodontic diagnosis, treatment undertaken was the surgical removal of the high frenum attachment in maxillary arch. After complete wound healing complete oral prophylaxis was done with slurry of pumice paste (S.S. White TM, Petropolis). Non extraction treatment plan was decided for this case. Teeth were etched with 37% phosphoric acid gel for 15 seconds. The primer (ORTHO LITE CURE) was applied to the acid-etched enamel with a micro brush. Beggs

brackets were bonded on maxillary anterior teeth using light cured transbond composite resin and polymerized with the help of LED light curing unit (3M ESPE™ Elipar S10).

Initial alignment and leveling phase of treatment was completed using A J Wilcock stainless steel 0.016" wire along with lingual buttons bonded on palatal surface of 11 and 12. E-Chain was attached from lingual button to central incisor bracket on the opposite side to correct torsi version of incisors (fig.2). The torsi version was corrected by couple mechanics generated from lingual button to Beggs bracket on opposite side. Midline space closure was decided to be done using elastomeric chain and up righting springs (fig.3, 4). After complete midline space closure, permanent retainer was bonded on palatal aspect of maxillary anterior region for the retention purpose (fig.5).

Up righting Spring

This spring was fabricated using 0.014 SS wire which contains helix with diameter of 3mm. The active arm is bent at 45° inward and downward, such that during activation the active arm rests completely on the arch wire (Fig 4).

TREATMENT PROGRESS

The treatment duration for closing of midline diastema was eight weeks (Fig 6). After eight weeks, IOPA was taken for the central incisors to check for the space closure and root paralleling.

DISCUSSION

The management of the midline diastema depends upon their etiology.[1] Wider diastema needs closure by fixed appliance for the correcting and controlling crown and root angulations .[2,3]

Up righting spring can reduce mesial crown tipping during diastema closure. However, a 2x4 appliance or utility arch can provide better vertical and torque control of incisors during closure of midline diastema and can also retract incisors. [4] Longer up righting spring made to apply a force more apically above cemento-enamel junction, closer to center of resistance of the tooth to enable more moment to force ratio. Large diastema closure with force applied at the bracket level leads to mesial tipping of crowns. Teeth tipped in such a manner remain unstable. This results in diastema recurrence by relapse over a period of time. Hence, the uprighting sprigs were used to move central incisors bodily.

Beggs brackets with up righting springs uses differential force system which ultimately carried out tooth movement faster with minimum trauma to surrounding periodontium. [1, 4]

Treatment of diastema varies and it requires correct diagnosis of its etiology, and early intervention relevant to the specific etiology. [5] There are many techniques available in the field of orthodontics to close the midline space using various materials; most of the techniques have resulted in relapse. Various materials to close the midline space are closed coil spring, different types of wire, wires with different cross sections, etc. [6,7]

Orthodontists usually encounter the challenges with relapse after treating midline diastema. Closure of the maxillary midline diastema with a prominent frenum is more predictable with frenectomy and concomitant orthodontic treatment than with frenectomy alone. [8]

This article describes case treated with Beggs brackets with up righting spring for maxillary midline diastema. Tipping movement of the central incisors in mesial direction using round wire has a better tooth control compared to the rectangular wire technique. Round wire resulted in tipping movement with no root parallelism which was achieved by using up righting springs. This technique is less invasive because it controls the both tipping and root up righting.

The median diastema have a tendency to recur after their closure.[5] Hence, a lingually bonded fixed retainer is recommended.[5] Edwards [9]found diastema relapse in 84% of his sample with a correlation between labial frenum and diastema relapse. Another study found midline diastema recurrence in 60% of the sample with stronger 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.[10]

CONCLUSION

Large median diastema causes psychological concerns among adult patients and requires closure by bodily movement of central incisors. Uprighting springs with round wire is a better way of treating midline diastema in which the occurrence of relapse can be reduced because of bodily movement of the tooth in mesial direction.

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FIGURE LEGENDS:

Figure 1: Pretreatment extraoral and intraoral photographs

Figure 2: Lingual buttons to correct torsiversion of incisors

Figure 3: Space closure using E chain

Figure 4: Uprighting springs (0.014 SS wire)

Figure 5: fixed palatal bonded retainer

Figure 6: Intraoral photograph taken after eight weeks of treatment