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Case Report

Mulligan's Bypass Arch to Unravel Lower Crowding – A Case Report

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Abstract

Space closure is a challenging process in orthodontic therapy. Ability of space closure after extraction requires great skills otherwise can result in relapse.Space closure can be done either by enmasse method or two step retraction method. In severe crowding cases, canine can be individually retracted and the anterior can be allowed to align by themselves without any orthodontic forces. Mullighan's bypass arch is one such method where these both mechanics can be incorporated. In this case report, Mullighan's bypass arch was used in lower arch to aid in avoiding the unwanted moment caused by the loop and produces more of a bodily retraction of the canine and at the same time decrowding the anterior teeth.

Keyword: Mulligan's bypass arch, lower crowding, Crowding, Two step retraction, Driftodontics.

Key Messages- Patients with a Class I dental malocclusion with severe crowding and proclination in lower arch which was considered for treatment with Mulligan's bypass arch.

INTRODUCTION

Space closure represents an important phase in fixed orthodontic therapy. For esthetic harmony, structural balance and functional efficiency in the orthodontic treatment, correct position and three-dimensional control in anterior teeth movement is essential [1, 2]. Space closure can either be done with en masse retraction or two-step retraction. In enmasse retraction, incisors and canine are retracted simultaneously [3] whereas in two step retraction, first step involves retracting canine individually followed by incisor [4-7]. Individual canine retraction is considered to be yielding less anchor loss as it produces less mesial force on anchorage teeth [3-5].

Distalization of canine can be done by various methods like active tie backs, niti coil springs, active lace backs, bypass arches, loop mechanics, mini implants, rare earth magnets, lasers, periodontal alveolar distraction.[7] One such method has been mentioned in this case report where Mullighan bypass arch is used for individual canine retraction in lower arch to utilize optimum advantage of minimum anchor loss and driftodontics. This case needs reporting as single canine retraction and driftodontics has a large advantage in the anchorage control and root resorption thus it is essential to popularize Mulligan bypass arch as it is combination of both the techniques.

CASE REPORT

18 year old male came to the department with the chief complaint of irregularly placed front teeth. The patient cited esthetics as the main reason for desiring orthodontic treatment. On extra oral examination, he had a mesocephalic, mesoproscopic face, a convex profile, posterior divergence and competent lips. The patient displayed a non-consonant smile arc.

Intraoral examination revealed Angle's class I molar relation bilaterally with proclination severe crowding in upper and lower anteriors. Upper midline was shifted to patient's right and overjet was 4mm (Figure 1).

FIGURE 1 – PRE-TREATMENT PHOTOGRAPHS

The cephalometric tracing confirmed that the patient had class I skeletal pattern. The patient had average growth pattern and proclined maxillary and mandibular incisors (lower incisor to mandibular plane angle of 105˚. In soft tissue analysis patient has an acute nasolabial angle.

Treatment plan

Following a thorough clinical and database analysis, extraction of upper and lower 1st premolar was decided upon with maximum anchorage requirement to maintain the class I molar relation bilaterally along with anterior retraction to its full potential. To limit anchorage loss in lower arch, Mulligan's bypass arch was used in lower arch [8].

Treatment progress

0.022 x 0.028" slot MBT appliance was used in this case. Posterior leveling and aligning was initially done with round 0.014 and 0.016 Niti wires. 0.018SS archwire was used to make the Mulligan's bypass arch. It was placed from canine to molars bilaterally bypassing incisors. E-chain was placed from the molar tube to canine hook with the force of 100g [9]. Individual canine retraction is carried about for 4 months and the anteriors were allowed to decrowd itself with driftodontics (Figure 2).

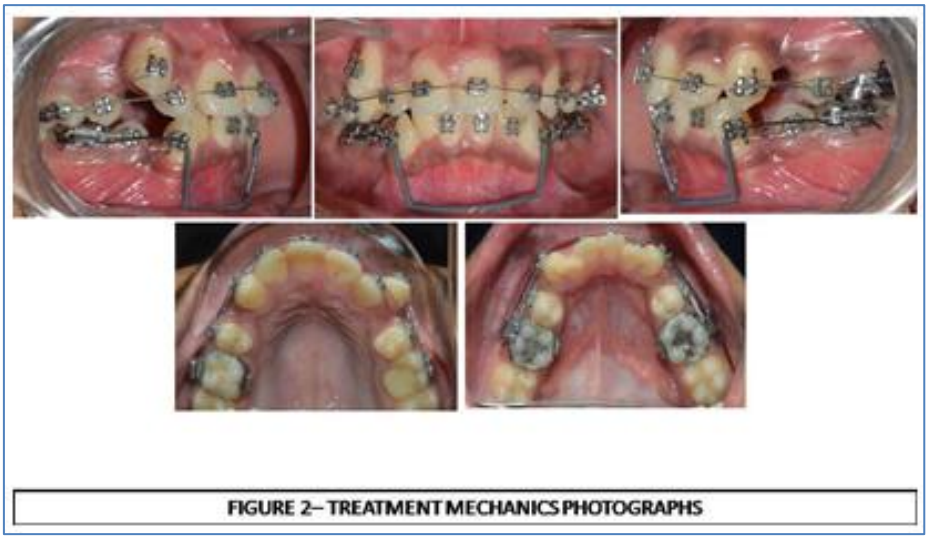

FIGURE 2– TREATMENT MECHANICS PHOTOGRAPHS

Meanwhile In upper arch, canine was pulled down with segmental wire. After the canine retraction in lower arch the anteriors were engaged with continuous archwire. E-chain was used for anterior space closure. After space closure and midline correction, 19x25 SS archwire was placed to co-ordinate the arches.0.021x0.025" braided SS was placed for finishing and detailing. Removable circumferential retainer and fixed retainer were given for retention. The total treatment time was 20 months.

TREATMENT RESULTS

Excellent improvement in esthetics was seen after the end of the treatment. Severe crowding and proclination were corrected while maintaining the buccal class I occlusion bilaterally. A desirable overjet and overbite were achieved with midline correction (Figure 3).

FIGURE 3 – POST-TREATMENT PHOTOGRAPHS

Patient was very happy with his esthetics as it was his chief complains. The patient was also impressed by reduced treatment time of 20 months.

DISCUSSION

Space closure is a challenging process in orthodontic therapy. Ability of space closure after extraction requires great skills otherwise can result in relapse Space closure can be either done with en masse retraction or two-step retraction. In enmasse retraction, incisors and canine are retracted simultaneously [3] whereas in two step retraction, first step involves retracting canine individually till the extraction space is completely closed between the canine and 2nd premolar followed by incisor retraction [4-6]. Individual canine retraction is considered to be yielding less anchor loss as it produces less mesial force on anchorage teeth [3-5]. Thus in our case report we have carried out two stage canine retraction.

Friction and frictionless mechanics are the two space closure method used for retraction. In a study done by Rhee *et al*., friction mechanic is proved to be better than frictionless as it gives better rotation control and maintain arch dimension. There is no significant difference in anchorage loss between the two methods [9]. Also in a randomized clinical trial carried out by Chetha S. *et al*., they compared active laceback versus Mulligan bypass arch and it was concluded that tooth movement is greater and also distal rotation and tipping is significantly less in Mulligan bypass group [10]. Thus in this case we chose friction mechanics with the help of e-chain stretched from molar tube to canine hook.

In our case we were able to get pleasant esthetics, good buccal occlusion bilaterally, coinciding midline with lower incisor to Nasion-point B plane angulation reduced from 36° to 27° By bypassing the lower anteriors, we allowed the lower incisors to decrowd by itself and obtain maximum anchorage. Thus strength of this technique is avoiding unnecessary anterior anchorage loss and minimum root resorption which is a common side effect of placing continuous archwire in lower incisors. Limitation of this method is that anteriors cannot be decrowded or retracted orthodontically until canines are completely retracted which might increase the treatment time.

CONCLUSION

Precisely made Mullighan bypass arch produces an appopropriate force required for individual canine retraction. Thus, bypass arch is very useful in cases with severe crowding along with maximum anchorage requirement.

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