



MODIFIED TWO BY FOUR APPLIANCE FOR SINGLE TOOTH ANTERIOR CROSSBITE CORRECTION

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ABSTRACT

Mixed dentition stage is a period of transition from primary teeth to permanent teeth. It is considered as one of the most crucial age for orthodontic treatment because of growth. Orthodontic treatment can be done as early as 7 years. Early correction of malocclusion can also ensure a proper growth and development. One of the appliances which can intercept the early malocclusion is the two by four appliance (2 × 4 appliance). This paper presents a case of anterior single tooth crossbite treated using a versatile modified 2 × 4 appliance.

Key words:

Mixed Dentition, Anterior Crossbite, 2/4 appliance, Malocclusion

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INTRODUCTION

Mixed dentition stage is a period of transition from primary teeth to permanent teeth. Many self correcting malocclusion occurs in this stage, due to this transition. Most common malocclusion during this stage are the anterior and posterior crossbites, crowding, rotations, midline diastema, spacing etc. [1] These malocclusions can occur involving a single tooth or a group of teeth in the arch. Anterior crossbites are commonly encountered in the mixed dentition and are an indication for early orthodontic intervention. Moyers has defined a simple anterior tooth crossbite as a dental malocclusion resulting from the abnormal axial inclination of one or more maxillary teeth. [2] The term anterior crossbite is used to describe a malocclusion in which one or more of the maxillary incisors occlude palatally to the mandibular incisors. [3] The prevalence of anterior crossbite ranges from 4.5% to 9.5% based on the respective studied populations. [4] In children with malocclusion, it is reported to be around 27%. [5] Early correction of crossbite is of greater importance and is recommended because it will prevent further complications and would require further comprehensive treatment, if left untreated. [6] (Estreia F, Almerich J, Gascon F. Interceptive correction of anterior crossbite. J Clin Pediatr Dent 1991; 15:157-9.) Crossbite can be of both dental or skeletal in origin. Skeletal anterior crossbite occur due to either genetic or hereditary influence or discrepancy in the size of the maxilla and mandible.

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The skeletal entity usually involves proclined maxilla positioned behind the mandibular incisors. In Dental crossbite, one or two teeth are often proclined. [7] An old orthodontic maxim states “the best time to treat a cross bite is the first time it is seen. [8] Different techniques have been used for anterior dental crossbite corrections. Most of the techniques for such corrections involve a removable appliance which requires good cooperation between the dentist and the patient for the success. This cooperation is sometimes difficult to obtain in pediatric patients. The following treatment methods have been suggested for correction of simple anterior dental crossbite: Tongue blade therapy, lower inclined plane, stainless steel or composite crowns, Hawley retainer with auxiliary springs, labial and lingual archwires. [9] Two by four appliance is used for rapid correction of single tooth anterior crossbites. [9] Advantages of 2 x 4 Appliance 1. Ease of application 2. Versatility 3. Prevention of malocclusion at an early stage 4. Shorter duration of treatment 5. Less application of force compared to the conventional orthodontic treatment. 6. Minimal root resorption 7. Improves the self-esteem at an early stage. Disadvantages of 2 x 4 Appliance 1. Cannot correct skeletal malocclusions 2. Needs significant patient cooperation 3. Unsuitable for primary teeth We report a case of Anterior single tooth crossbite treated using a versatile modified 2 × 4 appliance.

Case Report

A 8-year-old boy reported to the Pedodontics OP, with a chief complaint of irregularly placed upper front teeth since 1 year and also parent was esthetically concerned, therefore wanted treatment for the same. The patient had no significant medical

or dental history. No abnormality was detected on extraoral examination. Intraoral examination revealed Angle's Class I molar relation with permanent maxillary left central incisor in crossbite [Figure 1] Space analysis was done, showed that the maxillary arch had 0.5 mm arch length discrepancy. Treatment planned was to create 0.5 mm space for the maxillary left central incisor and correct the misalignment. Treatment was started in the maxillary arch by bonding MBT brackets to the maxillary central incisors and molar bands with pre welded buccal tube to the maxillary first molars [Figure 2] The maxillary left central incisor was also bonded with MBT bracket, and a 0.016" round nitinol archwire was used for labial movement and alignment of the maxillary left central incisor. To raise the bite, glass ionomer cement (GIC) of 2 mm thickness was placed on the occlusal aspect of 36 and 46, so as to achieve a 2 mm incisal clearance. On recall of the patient after 1 week, marked tooth movement was noted in relation to 21. After 2 weeks, the crossbite was completely corrected. The GIC placed on 36 and 46 were removed using an ultrasonic scaler. The wire was then changed to 0.017 × 0.022" NiTi [Figure 3] and retained for another 2 weeks followed by debonding [Figure 4]. The patient was further recalled after 1 week for follow-up and further treatments and the GIC was removed in the Posterior Region.



Figure 1 Pre – Operative Intraoral Photograph showing crossbite



Figure 2 Placement of Brackets and Ni-ti arch wire



Figure 3 Post –Operative after 1 week



Figure 4 Post –Operative Intraoral Photograph after Debonding

DISCUSSION

Anterior crossbite is the term used to define an abnormal labiolingual relationship between one or more maxillary and mandibular incisor teeth. Removable appliance is one of the most common method of treatment during the mixed dentition period. Removable appliances although easy to wear and patient comfort is more satisfactory, there are few drawbacks which includes 2 or 3 appointments, less control of tooth movements, improper activation can lead to unwanted tooth movements and requires immense patient cooperation. [10] In contrast to this fixed appliance treatment can be initiated immediately as soon as the permanent molars and incisors have erupted and have minimal patient discomfort and produces active and controlled tooth movement and due to the high application of force the treatment duration is comparatively faster compared to the removable appliances. [11]

The main aim of early treatment of crossbite correction is to tip the affected teeth labially to a point where a stable overbite relationship exists. The achieved normal overjet or overbite relationship prevents relapse. [12] Asher *et al* who stated that there is light continuous force in fixed appliance to correct the cross bite. [13] GIC was placed over the occlusal surface of 36 and 46 to open the incisal bite. The drawback of using GIC as bite block includes wearing away of the cement, chance of supra-eruption or intrusion of the molars. Lee *et al* outlined four factors to consider before selecting a treatment approach [14]; Adequate space in the dental arch to reposition the tooth; Sufficient overbite to hold the tooth in position following correction; An apical position of the tooth in crossbite that is the same as it would be in normal occlusion; A Class I occlusion. The 2 x 4 appliance is used in the clinical practice for treatment of rotation, crowding, or diastemas in the case of skeletal Class I, II and III patients. In this case, we used modified 2/4 appliance, since maxillary right and left lateral incisors were not erupted. Modified 2/4 appliance is a simple and effective method to correct anterior dental crossbite, particularly in the mixed dentition if all the permanent incisors have not erupted instead of conventional 2/4 appliance

CONCLUSION

Diagnosing malocclusion at an early stage and at a correct age can achieve improved stability of the treatment, need not get postponed till the eruption of all the permanent teeth. The use of removable acrylic appliances with posterior bite opening platforms and anterior finger springs for labial tipping of maxillary teeth requires patient cooperation. A 2 x 4 appliance is a versatile, easy to use and effective appliance which can intercept cross bite at an early stage with shorter treatment

duration comparably. Treatment of malocclusion at an early age can improve the growth and quality of life of children.

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Conflicts of interest

The authors of this manuscript declare that they have no conflicts of interest.

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