

2X4 Appliance: Effective Treatment Modality for Anterior Crossbite.

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ABSTRACT

The 2x4 appliance consists of bands on the first permanent maxillary molars, bonded brackets on the maxillary incisors, and a continuous archwire inserted into buccal tubes of the molar bands. It provides total control of anterior tooth position, allows precise and rapid positioning of the teeth, does not require any adjustment and is very well accepted by the patient, and. This case report presents correction of anterior crossbite at early mixed dentition stage with the help of 2x4 appliances. The results achieved, satisfied the esthetic demands of the patients as well as parents.

Keywords: 2x4 appliances, Cross bite, mixed dentition.

INTRODUCTION

Mixed dentition stage is a period of transition from primary teeth to permanent teeth. Due to this transition the differences between a malocclusion requiring correction with those which are self-correcting needs to be emphasized. Few of the most common malocclusion seen during this stage are the anterior and posterior crossbites, crowding, rotations, midline diastema, spacing etc. These malocclusions can occur involving a single tooth or a set of teeth in the arch.^[1]

Interceptive treatment is fundamental to reduce the severity of a developing malocclusion. Anterior cross bites should be intercepted and treated at an early stage because it is a self-perpetuating condition which if not treated early has the potential of growing into skeletal malocclusion and might at a later stage require major orthodontic treatment combined with surgical procedures.^[2] Interceptive orthodontic treatment at an early stage can not only boost the young child's self-esteem but also avoid the need of undergoing cumbersome orthodontic treatment in the future.

The 2X4 is a fixed appliance is made of bands on the first permanent molars, brackets bonded to the erupted maxillary incisors and continuous

archwires to provide/maintain good arch form, as well as control of anterior teeth.

The present case report focuses on a 2X4 appliance which can intercept anterior cross bite during mixed dentition stage.

CASE REPORT

9 year old boy reported to the Department of Pediatric Dentistry, DY Patil Dental school with a chief complain of malaligned teeth. There was no significant family or medical history. On intra oral examination maxillary left central incisor and right lateral incisor were palatally placed resulting in a severe anterior cross bite. Also the right central incisor was rotated distally(Fig 1). Initially posterior bite plane with double 'Z' spring was planned for the correction of crossbite. However to reduce the time frame of the treatment plan a 2X4 appliance therapy was considered.

2X4 Appliance

After discussing the treatment modalities with parents, treatment was initiated by cementing orthodontic molar bands with buccal tubes on permanent first molars on both sides. Metal brackets MBT with a 0.022" slot were bonded on the labial aspects of the four maxillary permanent incisors. A nickel-titanium (Ni-Ti) 0.012" round archwire was placed into the bracket slots and then into the molar tube on both sides(Fig. 2). The wire was stabilised in its position using elastic ties for 1 month. The 0.012" round Ni-Ti archwire was changed to the 0.014" round Ni-Ti archwire and

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retained for further another 1 month before debonding of the brackets. At 2-month review, the incisor teeth were in positive overjet. All the four incisors had been aligned in proper position well maintain the “Ugly Duckling Stage”(Fig.3). The patient is kept on follow-up every month.

DISCUSSION & CONCLUSION

Anterior cross bite is a condition in which one or more maxillary anterior teeth are in lingual relation to the mandibular teeth. Anterior cross bites should be intercepted and treated at an early stage because it is a self-perpetuating condition which if not treated early has the potential of growing into skeletal malocclusion and might at a later stage require major orthodontic treatment combined with surgical procedures.^[3] In the present case report the child presented with dentoalveolar cross bite which is often manifested as a multiple teeth cross bite .Either skeletal or dentoalveolar, the treatment of anterior crossbite is recommended in primary and early mixed dentition. The aim of early treatment of this type of malocclusion is to correct anterior crossbite, as otherwise often can lead to very serious Class III malocclusion which would be possible to treat only with combined orthodontic and orthognatic method.

One of the most common mode of treatment during the mixed dentition period is the use of removable appliances. Removable appliances although are 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.^[4] In contrast to this fixed appliance treatment can be initiated immediately as soon as the permanent molars and incisors have erupted, have minimal patient discomfort except while placing the bands and brackets, 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.^[5]

A 2x4 appliance, which is a sectional fixed appliance, results in more effective and efficient positioning of teeth as three dimensional control is possible during correction of malaligned anterior teeth.^[6] Therefore diastemas, rotations and improper inclinations of teeth can be treated very easily and quickly using this technique (Dowsing, 2004).^[7] Besides this, one also has to have the knowledge with what “should be” or “should not be” treated at mixed dentition stage. This is due to the reason that many self correcting malocclusions exist during this stage, but it will get corrected once the transition has taken place. The highlight of the present case is that the self correcting malocclusion ‘Ugly duckling stage’ was well maintained.

Sectional fixed treatment aids in early correction of minor malocclusions like rotations or malpositioning involving one or more teeth (McKnight, 1965; Lee, 1978).^[8,9] One should be very cautious in selection of patients who are candidates of fixed appliance therapy. As the 2x4 appliance is one type of fixed orthodontic appliance, it can be used in different clinical situations with only minor alterations in the appliance design (Graber, 1972; Benham, 1975).^[10] One of the disadvantages of using the 2 × 4 appliance during the early mixed dentition stage is the placement of bands on the maxillary first permanent molars. Placement of the molar band could be a problem if the permanent molar has not fully erupted or it has a short clinical crown height. Sometimes, placement of the band also can cause discomfort, and some children may refuse further treatment. Furthermore, as the brackets are only bonded to the permanent incisors, there will be a long span of a flexible 0.014” round Ni-Ti archwire extending from the molar bands to the incisors. The dangling wire can be a problem to the young patients especially during eating and tooth brushing as the wire dangles can easily come out from the molar tube. Another disadvantage of the 2 × 4 appliance is plaque retention around the bands and brackets. However, this could be easily overcome with good oral hygiene care.

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