Case study

SINGLE ANTERIOR CROSSBITE CORRECTION IN MIXED DENTITION USING VERSATILE 2X4 APPLIANCE ALONG WITH POSTERIOR BITE PLANE: A CASE REPORT

Comment [A1]: ANTERIOR CROSSBITE CORRECTION OF SINGLE TOOTH IN MIXED DENTITION USING VERSATILE 2X4 APPLIANCE ALONG WITH POSTERIOR BITE PLANE: A CASE REPORT

ABSTRACT:

The period of mixed dentition is considered as one of the most crucial ages for getting orthodontic treatment. One common misconception that parents have is that orthodontic treatment should only be started after all of the permanent teeth have fully emerged. Early mixed dentition patients with anterior cross bites and ectopic incisors are treated versatile 2x4 appliance along with posterior bite plane. This appliance has many benefits over alternative methods, including complete control over anterior tooth positioning, excellent patient acceptance, no patient adjustment needed, and the ability to accurately and quickly position teeth. The present case report refers who reported to the department with complains irregularly placed teeth which was managed with 2 X4 appliance.

Keywords: Crossbite, Interceptive orthodontics, Mixed dentition, 2X4 appliance.

INTRODUCTION:

Mixed dentition is characterized with primary teeth are changing into permanent teeth. This transition requires a focus on the differences between malocclusions that require correction and those that correct themselves. The anterior and posterior cross bites, crowding, rotations, midline diastema, spacing, and other malocclusions are a few of the most frequent malocclusion seen at this stage. A single tooth or a group of teeth in the arch may develop one of these malocclusions.[1]

Comment [A2]: Primary teeth that are changing

Crossbite is well defined as, “abnormal relationships of a tooth or teeth to the opposing teeth, in which normal buccolingual/labiolingual relationships are reversed”. Crossbites may have skeletal or dental origins involving the anterior, posterior, or both teeth. Anterior crossbite is defined as, “a malocclusion in which one or more of the maxillary

anterior teeth occlude lingually to the mandibular incisors". The most common malocclusion encountered during a child's occlusion's development is an anteriorly located single tooth crossbite of dental origin.[2,3] During the early stages of the dentition's development, anterior dental crossbite usually becomes evident. A number of factors, including lingually erupting maxillary anterior incisors, supernumerary teeth, retained deciduous tooth or root, crowding, insufficient arch length, and upper lip biting habits, cleft lip these are the factor can cause an anterior crossbite. [4]

In order to reduce the severity of a developing malocclusion, interceptive orthodontic treatment is essential. Anterior cross bites should be detected and treated as soon as possible because they are a self-perpetuating condition that, if left untreated, could develop into skeletal malocclusion and eventually require extensive orthodontic treatment in addition to surgical procedures.[5]

There are several ways to manage a developing or developed anterior dental crossbite. The suggested plan of action for treating an emerging or established anterior crossbite is 2X4 a fixed appliance. The 2X4 appliance is a fixed appliance that controls the position of the anterior teeth by using bands on the first permanent molars, brackets bonded to the erupted maxillary incisors, and continuous archwires.[6]

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

CASE REPORT:

A 11 year old male patient reported to the department of Pediatric and Preventive Dentistry ,with a chief complain of mal-aligned teeth. There was no previous history of dental treatment, and his medical history was non-contributory. Intraoral examination revealed the patient was in mixed dentition stage with the first permanent molars in a Class I relationship. The maxillary left central incisor was palatally placed resulting in an anterior cross bite. [Figure 1,2,3]

Comment [A3]: Complaint

2X4 APPLIANCE:

After discussing the treatment modalities, 2X4 appliance treatment was considered for the correction of anterior cross bite. Informed consent was taken from the parent before starting the treatment. The treatment was initiated by cementing orthodontic molar bands with buccal tubes on permanent maxillary 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) 0.014″ round archwire was placed into the bracket slots and then into the molar tube on both sides[Figure 4,5,6]. The wire was stabilised in its position using ligature wire for 1 month. Composite build up was done on maxillary permanent molars on both sides to disocclude the occlusion to achieve a 2 mm incisal clearance. The 0.012″ round Ni-Ti archwire was changed to 0.016″ round Ni-Ti archwire and retained for further 1 month[Figure 7]. After correction of the crossbite, the composite build up was removed from the occlusal surface of 36 and 46 using ultrasonic scaler. Post operatively, full mouth ultrasonic scaling was done followed by fluoride application. No retainer was required after the correction of cross bite as it is self retentive. The total active orthodontic treatment time was 2 months.

DISCUSSION:

To correct developed abnormalities, interceptive procedures should be widely used during the mixed dentition period. Due to the locking of the upper incisor behind the lower incisor and subsequent progression to severe tooth malalignment, anterior crossbite rarely corrects itself on its own. Therefore, consideration of the primary approach can restore the proper muscle balance and a well-organized occlusal development.[7,8,9] There are numerous ways to manage an developing or developed anterior dental crossbite. Treatment options for developing or developed anterior dental crossbite include labial and lingual archwires, lower inclined planes, crowns made of stainless steel or composite material, and Hawley's retainer with double cantilever springs.[4]

Contrarily, with a fixed appliance, treatment can begin as soon as the permanent molars and incisors have erupted, with minimal to no discomfort for the patient other than when bands and brackets are being placed. A fixed appliance also produces active, controlled tooth movement, and because it uses more force than removable appliances, treatment time is comparatively shorter.[10]

Since a 2x4 appliance, a sectional fixed appliance, allows for three-dimensional control during the correction of misaligned anterior teeth, it results in more effective and efficient positioning of teeth.[11] In addition, one must be aware of the conditions that "should" or "should not" be treated at the stage of mixed dentition. This is because there are a lot of self-correcting malocclusions present at this stage, but they will be fixed once the transition has taken place. The self-correcting malocclusion "Ugly ducling stage," which is the case in

Comment [A4]: duckling

this instance, was well maintained. When one or more teeth are rotated or positioned incorrectly, sectional fixed treatment helps to correct minor malocclusions early. (McKnight, 1965; Lee, 1978).[12,13]

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).[14]

DISADVANTAGES 2 × 4 APPLIANCE:[1]

- While using the 2 × 4 appliance during the early mixed dentition stage 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.
- Placement of the band also can cause discomfort, and some children may refuse further treatment.
- 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.
- 2 × 4 appliance is plaque retention around the bands and brackets is common. However, this could be easily overcome with good oral hygiene care.

CONCLUSION:

One of the keys to achieve a successful orthodontic treatment results lies in the hands of the parents as well as pedodontist. Identifying a malocclusion at an early stage and diagnosing the malocclusion at a correct age can lead to achieve stability in the treatment results. A 2 x 4 appliance is a versatile, easy to use and effective appliance which can intercept simple malocclusions at an early stage with shorter treatment time duration compared to the traditional treatment.

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LEGENDS:

Figure 1: Pre-operative front view

Figure 2: Pre-op right view

Figure 3: Pre-op left view

Figure 4 : Post -op front view

Figure 5 : Post-op right view

Figure 6 : Post-op left view

Figure 7:One month follow up

Figure 1: Pre-operative front view

Figure 2: Pre-op right view

Figure 3: Pre-op left view

Figure 4 : Post -op front view

Figure 5 : Post -op right view

Figure 6 : Post -op left view

Figure 7:One month follow up