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Correction of Single Tooth Anterior Crossbite Using 2x4 Appliance In Pediatric Patient: A Case Report

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ABSTRACT: Anterior crossbites are very common in mixed dentition stage. It can be treated using removable and fixed appliances. This case report describes a case of single tooth anterior crossbite in a 14 year old female patient. The crossbite was corrected using 2x4 fixed appliance. The crossbite was corrected in short duration and desirable outcome was evident. 2x4 appliance can be used efficiently and effectively in treating anterior crossbite both in early mixed dentition stage and in long standing crossbite cases.

Keywords: Anterior crossbite, 2x4 appliance, NiTi wire

I. INTRODUCTION:

Single tooth anterior crossbite has been a very common finding. This can either be due to a skeletal or dental deficiency. The most common cause of nonskeletal anterior crossbite is the lack of space for the permanent maxillary incisors to erupt. According to the studies, the incidence of crossbites ranges from 1-23%, out of which 6-7% constitute single tooth crossbites.(1)

The main causes of anterior crossbites were delayed exfoliation of the corresponding primary tooth, arch length discrepancy or trauma during primary dentition which leads to change in eruption pathway of permanent tooth, presence of supernumerary anterior teeth, habit of biting the upper lip odontomas etc.(2) Interception of such cases of crossbite should be started as soon as the crossbite is detected. An old orthodontic maxim states "the best time to treat a cross bite is the first time it is seen."The correction of crossbites is done to prevent abnormal growth of both jaws, to avoid the occurrence of neuromuscular disturbances in the temporomandibular joint function due to jaw asymmetry or any functional displacement of the mandible. It can also leads to permanent dental, skeletal or functional defect.(3)

In mixed dentition stage, anterior crossbite can be corrected satisfactorily using blade therapy, lower inclined plane, reverse stainless steel crowns, removable appliances such as Hawley's retainer with auxiliary spring if only tipping movement is required. But in case of permanent dentition where bodily movement is required, then fixed orthodontic treatment should be considered. Also, removable appliance may worsen the situation in the case of erupting rotated teeth, whereas fixed appliance allows the full alignment of the labial segment.(4)

However, treating single tooth dental crossbite with a simple 2x4 fixed partial appliance is a suitable choice.

II. CASE REPORT:

A 14 year old female patient reported to the Department of Pedodontics and Preventive Dentistry with the complain of irregularly placed upper front tooth and she wants to get it corrected as it gives her an unaesthetic appearance. The patient had no significant medical or dental history. No abnormality was detected on extraoral examination. Intraoral examination revealed mild dental fluorosis, Angle's Class I molar relation with permanent maxillary left central incisor in crossbite. Attrition of the left central incisors was seen because of the crossbite. Oral hygiene was poor, generalized gingival inflammation and bleeding on probing was present Fig.1(a and b).

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Fig. 1, (a) shows pre-operative intraoral photograph of single tooth crossbite irt 21, (b) palatal view, (c) after oral prophylaxis was performed and (d) placement of brackets and wire.

On the first appointment, oral prophylaxis was done and orthodontic separators were placed around upper molars on both sides since there were tight contacts Fig.1(c). Treatment was then started in the maxillary arch by bonding MBT (preadjusted edgewise) brackets to the maxillary anterior teeth and molar bands with prewelded buccal tube to the maxillary first molars. Initially, a 0.012" round NiTi arch wire was used for labial movement and alignment of the maxillary left central incisor. An acrylic bite block was cemented with GIC on lower posteriors to achieve incisor clearence Fig.1(d). The patient was recalled after 1 week to see the progress of treatment and oral prophylaxis was done to maintain oral hygiene Fig.2 (a). After 2 weeks, correction of crossbite can be seen and acrylic bite block was removed Fig.2(b). On the 3rd week, arch wire was changed to 0.014" round NiTi to correct the remaining inclination of maxillary left central incisor Fig.2(c). Ligatures and 0.016" NiTi round archwire were changed at 4^{th} week Fig.2(d), and at 5^{th} week, debonding was done and the chipped and attrited incisal edge of left maxillary central incisor was build-up with composite restoration Fig.3(a,b). Retainer was not provided as there is adequate overjet and overbite.

Fig. 2 (a) shows recall after 1 week, (b) shows recall after 2 weeks, (c) shows recall at 3 weeks and (d) shows recall after 4 weeks.

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Fig. 3 (a) shows debonding after 5 weeks and (b) shows composite build-up of tooth 21.

III. DISCUSSION:

Many treatment modalities ranging from simple to complex means are available to correct anterior crossbite. Appropriate method to treat anterior crossbite will depend on the aetiology of the crossbite, the patient's age and compliance, eruption status of the teeth, space availability, and treatment affordability.[5] According to Lee[6], four factors should be considered before selecting a treatment option, which are - (a) there should be sufficient space in the arch to reposition the tooth, (b) there should be enough overbite to hold the tooth in position after correction, (c) apical position of the tooth in crossbite is the same as it would be in normal occlusion and (d) Class I occlusion.

The 2x4 appliance in the present case made use of preadjusted MBT brackets which delivers light continuous forces to the tooth and NiTi archwires which exhibit superelasticity and shape memory properties, were mainly useful to align severely malpositioned teeth.[7] 2x4 appliance offers quick and comfortable approach compared to removable appliances which often leads to difficulty in speech, gagging, allows only tipping movements or unpredictable changes and requires full patient compliance.

The advantages of using 2x4 appliance is that the appliance is versatile, easy to use and well tolerated by all patients. Its use is not just limited to single tooth crossbite correction but it provides complete alignment of the incisors including rotations and irregularities, impaction of incisors and unilateral posterior crossbite as well. It can also be modified as per the requirement like if space is required in proclination of the incisors, a compressed nickel titanium coil spring is placed into a 2–3 mm gap and simultaneously quadhelix can be soldered to the molar bands for correction of posterior crossbite if required.[8]

IV. CONCLUSION:

2x4 is a simple and easy to place appliance which significantly helps in treating the potentially challenging mixed dentition problems. In the present case, the results were acceptable and regular while the changes were obtained within a short duration using this appliance and betterment in patients' smile was evident.

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CONFLICTS OF INTEREST:
There are no conflicts of interest.

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