

Intercept to Align by 2 x 4 Appliance – Series of 3 case reports¹Manisha Tyagi, MDS (3rd Year PG) Pediatric & Preventive Dentistry, Subharti Dental College & Hospital²Shobhit Mishra, MDS (3rd Year PG) Pediatric & Preventive Dentistry, Shree Bankey Bihari Dental College³Abhishek Jain, MDS (3rd Year PG) Pediatric & Preventive Dentistry, Shree Bankey Bihari Dental College⁴Arushi Gautam, MDS (Senior Lecturer) Pediatric & Preventive Dentistry, Shree Bankey Bihari Dental College⁵Elizabeth Moirangthem, MDS Pediatric & Preventive Dentistry, Rajasthan Dental College & Hospital⁶Aman Jain, MDS (3rd Year PG) Pediatric & Preventive Dentistry, ITS Dental College & research centre**Corresponding Author:** Manisha Tyagi, MDS (3rd Year PG) Pediatric & Preventive Dentistry, Subharti Dental College & Hospital.**Citation of this Article:** Manisha Tyagi, Shobhit Mishra, Abhishek Jain, Arushi Gautam, Elizabeth Moirangthem, Aman Jain, "Intercept to Align by 2 x 4 Appliance – Series of 3 case reports", IJDSIR- September - 2020, Vol. – 3, Issue - 5, P. No. 527 – 531.**Copyright:** © 2020, Manisha Tyagi, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. Which allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Case Report**Conflicts of Interest:** Nil**Abstract**

Prevalence of malocclusion in the mixed dentition period is high. As aesthetics is a major concern for parents and the child, they seek advice from dental surgeons regarding its correction. This transition period is therefore crucial because early treatment would correct the occlusion as well as ensure normal development of teeth and jaws and prevent the psychological trauma that child would bear if treatment is delayed. 2x4 appliance can be used for correction of anterior and posterior cross bites, alignment of ectopic incisors and other orthodontic corrections. This article describes three cases wherein orthodontic correction was done in a short period of time and with relative ease as an interceptive procedure in mixed dentition stage using 2x4 appliance. This appliance

quickly restores anterior aesthetics and also reduces the complexity and duration of any subsequent treatment. If used cautiously, this appliance can be very advantageous in correction of malocclusion.

Keywords: 2x4 appliance; Malocclusion; Esthetics; Orthodontic treatment.**Introduction**

Mixed dentition period has always been controversial, with regard to the appropriate time to initiate the treatment and type of treatment to be undertaken [1]. It is therefore the most crucial period because early treatment would correct the occlusion as well as ensure normal development of teeth and jaws [2]. This article draws attention towards the versatility of 2x4 appliance as it can be used for correction of anterior and posterior cross bites,

alignment of ectopic incisors and other minor corrections [3]. It resolves various problems in a simple manner and in a relatively short period.

Case report

1) A ten year old boy reported to dental OPD with major concern of anterior crossbite. He presented with class 3 central incisor relationship and was in mixed dentition stage with labial proclination of upper lateral incisors (Figure 1). Chief complaint of parents was that upper teeth were behind the lower teeth.



Figure 1: Pre-treatment photograph of tooth 11 and 21 in crossbite and protruded lateral incisors.

Moyer's mixed dentition space analysis was performed which revealed that there was adequate space available for realignment of teeth within the arch. Treatment plan was discussed with the parents and a short span fixed orthodontic treatment was recommended. Bands were adapted on first permanent molars, impression was made and nance palatal arch was fabricated to provide anchorage on the palatal side of the adapted bands. Molar tubes were soldered on the buccal aspect of bands. On the next appointment, nance palatal arch was cemented with molar tubes on patient's maxillary 1st molars. Brackets were bonded on the labial aspects of the four maxillary permanent incisors. An initial .016 NITI aligning arch

wire was placed into the bracket slots and was cut equally on both sides of the centreline (Figure 2).



Figure 2: 2x 4 appliances in place during treatment.

A 2 mm thickness of glass ionomer cement (GIC) was placed on the occlusal aspects of both the mandibular first permanent molars (tooth 36 and tooth 46) to raise patient's bite. Patient was recalled after every 21 days. Within 3 months, crossbite correction was seen in the anterior region. After two weeks of correction debonding was done (Figure 3) and lingual retainers were given.



Figure 3: Post treatment photograph at 3-month review after correction of the anterior crossbite

2) A thirteen year old female reported to dental opd with complaint of supernumerary and rotated teeth in anterior region which compromised her aesthetics (Figure 4).



Figure 4: Pre-treatment photograph of supernumerary and rotated teeth in anterior region

She presented with class 1 molar relationship. Patient presented with no previous dental history. After Space analysis using Moyer's mixed dentition analysis, 2X4 appliance was planned with .016 NITI aligning arch wire. Her supernumerary tooth was removed prior to the orthodontic treatment (Figure 5).



Figure 5: 2x4 appliances in place during treatment. Patient was recalled after every 21 days. At 2nd follow up angulation correction was seen. At 2 month follow up midline closure was observed (Figure 6).



Figure 6: At 2-month review after correction of midline. Brackets were kept for another two weeks after correction, then debonding was done and lingual retainers were given. 3) A eight year old girl reported to dental OPD with major concern of crossbite irt teeth 22 (Figure 7). Mother of the patient noticed that her daughter's one upper teeth in front region is behind her lower teeth. She gave a past dental history of restorative treatment in her teeth a year ago.



Figure 7: Pre-treatment photograph of tooth 22 in crossbite. Space analysis was done using Moyer's mixed dentition analysis and it was decided to go for 2X4 appliance with .014 NITI aligning arch wire (Figure 8).



Figure 8: 2x4 appliance in place during treatment.

Patient was recalled after every 21 days. At 3 month follow up, crossbite correction was seen. After two weeks of correction debonding was done (Figure 9) and lingual retainers were given.



Figure 9: Post treatment photograph at 3-month review after correction of the crossbite

Discussion

Interceptive treatment is usually carried out in order to reduce the severity of a developing malocclusion. Removable appliances are most commonly used treatment protocol for the minor orthodontic corrections in mixed dentition period. But the associated disadvantages are lack of control over tooth position, uncontrolled tipping movements, unavoidable lab work and poor patient compliance.

Though they require less chair side time and are easy to wear but due to above mentioned disadvantages, these are ill-favoured by clinicians.

The treatment period with 2X4 alliance is quite short as compared to removable appliances. It has been opted by clinicians over removable appliances for malpositioning, crowding, management of rotation, or diastemas in the case of skeletal Class I, II and III patients.

As per statistics, 28.85% of general dentists and 27.66% of orthodontists have used the 2 x 4 for treating space problems without sagittal positive or negative overjet, in skeletal Class I patients. 51.92% of general dentists and 52.13% of orthodontists choose the 2x4 as an interceptive orthodontic appliance for the management of space problems associated with increased or decreased overjet or in patients with Class II or III malocclusion [4].

Yang and Kiyak conducted a survey on the view of orthodontists, regarding their preferences on treatment timing for crossbites. Approximately 80% stated that they would treat anterior crossbites as well as ectopic development in the early mixed dentition with a 2x4 appliance [5].

In the present case report it was found that this appliance allows rapid correction of many incipient malocclusions in a short phase of fixed appliance therapy in the early mixed dentition stage. This appliance not only quickly restores anterior aesthetics but may also reduce the complexity and duration of any subsequent treatment [3]. If used cautiously, it can be very advantageous in correction of malocclusion.

Conclusion

The cases above demonstrate the versatility of the 2x4 appliance in the correction of anterior crossbites and alignment of the incisors. The treatment objectives were achieved with a short course of treatment. If given at a correct time, this can minimize the chances of malocclusion to a great extent. Therefore a correct knowledge of its indications, technique of use and favourable & unfavourable sequelae must be understood.

References

1. Bhola M, Gera T. Orthodontic Intervention In Mixed Dentition: A Boon for Pediatric Patients. IDA Lud J – le Dent 2018;2(2):10-16.
2. Kushwah A, Kumar M, Jaiswal A, Shailesh T. An Introduction to interceptive orthodontics. TUM J Dent 2017;4(3):118- 120.
3. McKeown HF, Sandler J. The two by four appliance: a versatile appliance. Dent Update. 2001;28(10):496-500.
4. Quinzi V, Ferro R, Rizzo FA, Marranzini EM, Federici Canova F, Mummolo S, Mattei A, Marzo G. The Two by Four appliance: a nationwide cross-sectional survey. Eur J Paediatr Dent. 2018;19(2):145-150.
5. Yang EY, Kiyak HA. Orthodontic treatment timing: A survey of orthodontists. Am J Orthod Dentofac Orthop 1998; 113: 96–103.