



EARLY INTERCEPTION USING 2X4 APPLIANCE: A CASE SERIES


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ABSTRACT

The 2x4 appliance comprises bonds on the maxillary incisors, bands on the first permanent molars and a continuous archwire. The appliance is used in the early mixed dentition for correction of alignment of maxillary anterior teeth. Three cases using this appliance are presented. This appliance offers many advantages over alternative techniques as it provides complete control of anterior tooth position, is extremely well tolerated, requires no adjustment by the patient and allows accurate and rapid positioning of the teeth.

Key words: Interceptive, 2x4 appliance, Malocclusion.

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INTRODUCTION

Interceptive treatment is usually carried out in order to reduce the severity of a developing malocclusion. This type of treatment is very often indicated and carried out in the mixed dentition and brings with it unique challenges. Timing of orthodontic treatment has always been the subject of much debate over the years. Areas investigated include:

- The clinical effectiveness
- The influences on the outcome of early treatment
- Psychological influences
- Cost effectiveness
- Orthodontists’ preference [1-5]

The 2x4 appliance comprises bands on the first permanent molars and bonds on the erupted maxillary permanent incisors. Continuous arch wires are used to provide complete control of the anterior dentition as well as a good arch form. The deciduous teeth are generally unsuitable for bonding [6]. This appliance allows rapid

correction of many incipient malocclusions in a single short phase of fixed appliance therapy in the early mixed dentition stage.

CASE 1

A 9 year old boy reported to the department with the chief complaint of extra and malaligned teeth causing unaesthetic appearance. He presented with skeletal class 1 base in the mixed dentition. Clinical examination revealed retained deciduous central and lateral incisor of the left maxillary quadrant and permanent CI and LI of the same quadrant in crossbite (Fig 1a). Retained CI and LI were extracted followed by bonding of brackets to the permanent incisors and banding of maxillary first permanent molars. 0.012 inch NiTi was used for initial alignment. An acrylic bite plane was simultaneously delivered to the patient for relieving the bite. Progression was with 0.016 niti,0.017x0.025niti and 0.017x0.025 stainless steel wires. No retainer was required after the correction as the correction of cross bite is self-retentive. Total active orthodontic time was 9 months (Fig 1b).

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CASE 2

A 11 year old boy reported to the department with the chief complaint of unaesthetic appearance of upper front teeth. The central incisors were retroclined with proclined lateral incisors (Fig 2a). Class 1 molar relation was present with slight deep bite. 2x4 fixed orthodontic treatment was planned. Initial alignment was done using 0.014 niti followed by 0.017x0.025 niti and 0.017x0.025 stainless steel wire. Results were achieved in 8 months after which a removable retainer was given to the patient(Fig 2b).

CASE 3

A 12 year old boy reported to the department with the chief complaint of spacing between upper front teeth. On clinical examination, diastema was present between his central incisors due to high frenum attachment (Fig 3a). Class 1 molar relation was present and increased overjet with normal overbite was seen. 2x4 fixed ortho was started with 0.014 niti wire for alignment followed by 0.017x0.025 niti and 0.017x0.025 stainless steel and accompanied by power e-chain for space closure. Frenectomy was done in the mid of treatment to facilitate complete closure of the diastema. Diastema and overjet were corrected in 8 months and then fixed retainer was placed (Fig 3b).

DISCUSSION

The concept of using sectional appliances is not new. Johnson introduced the Twin-wire-arch in the 1930s, which comprised incisor and molar bands and small diameter twinwires sheathed in buccal tubings along with various auxiliaries such as palatal arches, inter maxillary hooks and coil springs. Evidence suggests that a short course of orthodontic treatment in the mixed dentition may improve function and aesthetics, reduce the potential for teasing and remain relatively stable once the appliance is removed.

ADVANTAGES OF FIXED APPLIANCES

- Minimal discomfort
- Reduces need for patient co-operation
- Increase control of tooth movements
- Movement possible in all three planes of space [7].

DISADVANTAGES OF REMOVABLE APPLIANCES

- Appliance rarely worn full time
- Appliance damage/lost appliances
- Difficulty in speech/eating
- Gagging
- Decalcification/caries
- Gingivitis/palatal hyperplasia/fungal infections
- Incorrect activation produces unhelpful changes
- Allow only tipping of teeth[8].

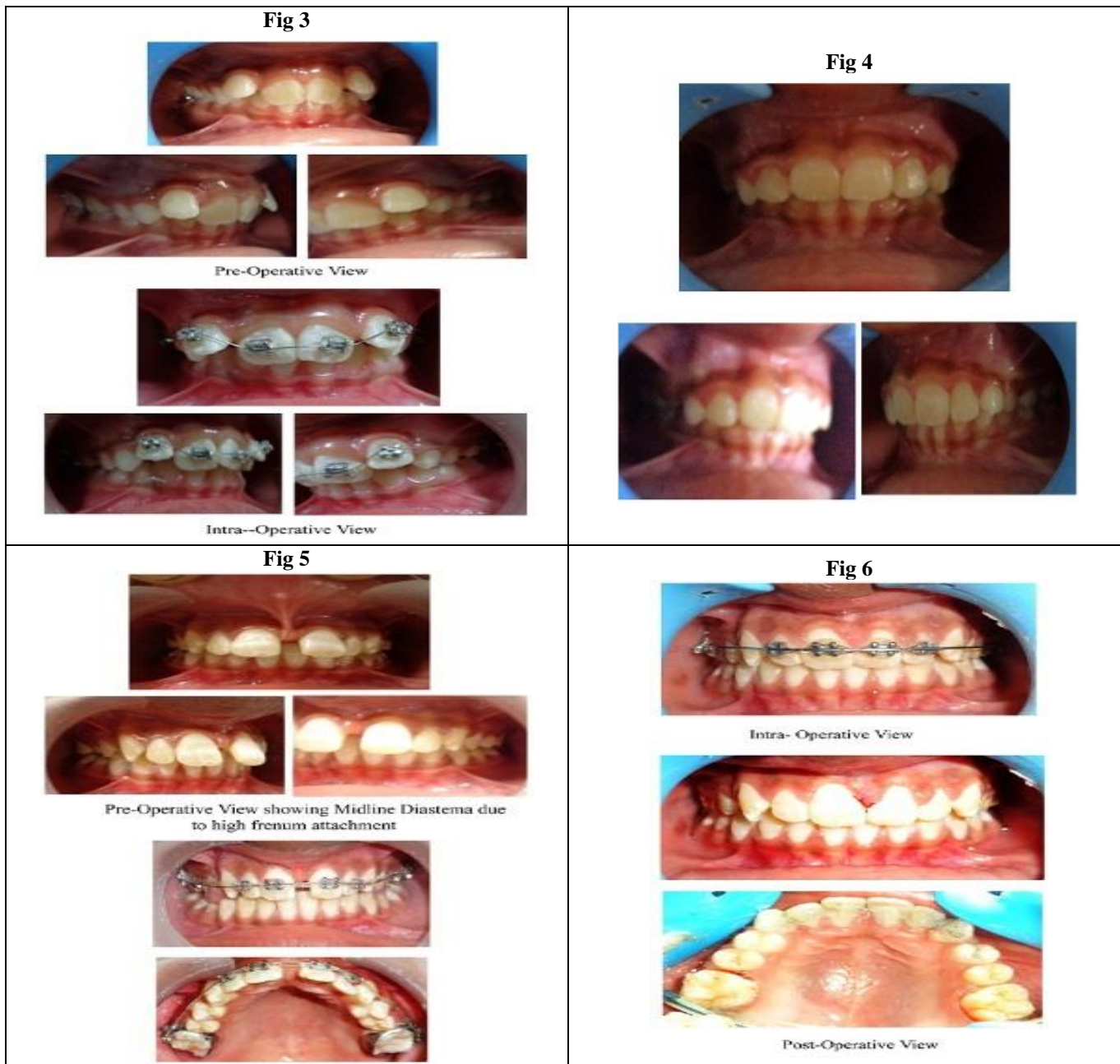
Placement of the fixed appliance usually only takes a little longer than the time required to fit a removable appliance and may be even carried out at a single visit. Another advantage is that no laboratory facilities are required. Treatment may start as soon as sufficient permanent teeth have erupted and it is felt that the child is co-operative enough to have separators placed, bands cemented and brackets bonded. Although there needs to be patient co-operation for the placement, adjustment and removal of the appliance, the importance of compliance during active treatment is usually less than that for a removable appliance. It is still essential that the patient is capable of maintaining a high standard of oral health in view of the increased risk of demineralisation associated with a fixed appliance. Treatment carried out in this mixed dentition stage may take as little as a couple of weeks, but in the more difficult cases can take longer.

2X4 APPLIANCE DESIGN

The basic design of the appliance is as follows:

- Bands cemented on the first permanent molars
 - Brackets bonded onto the erupted maxillary incisors
- Continuous archwires to provide/maintain good archform, as well as control of anterior teeth





CONCLUSION

The 2x4 appliance described in the article is versatile, easy to use and well tolerated by all patients. A series of case reports have been presented identifying how versatile the 2x4 appliance is and how it can be adapted to treat different problems. Many of these problems have been treated traditionally with removable appliances. However, the 2x4 appliance, when used correctly, will give a more controlled approach to tooth movement in all three dimensions and a more predictable outcome.

STATEMENT OF HUMAN AND ANIMAL RIGHTS

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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Nil

CONFLICT OF INTEREST

None.

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