A Case Report

Simultaneous Correction of Midline Diastema & Laterial Incisor Crossbite With Single Removable Appliance & Sectional Bracketing: A Case Report

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Abstract

Malocclusion are the most common conditions affecting the esthetics during the mixed dentition period of children. The objective of the treatment should be conservative, economical, and comfortable to the patient, with satisfaction being the major treatment outcome. The purpose of this case report is to describe the economical easy management technique in a boy aged 11 years, for correction of midline diastema and anterior single crossbite by a removable appliance incorporating a split labial bow and a z-spring, respectively and correcting both problems simultaneously with single appliance in 3 months with final alignment finishing with the help of sectional bracketing.

Introduction

In the contemporary generation, esthetic has an essential role in the social well being of individuals irrespective of age. Maxillary midline diastema appears in 97% of children with primary dentition and 48.8% in early mixed dentition phase that signifies its regression with age, whereas the incidence of anterior crossbite ranges from 4% to 5%.[1]Early intervention, once the diagnosis is made, forms the basis of interceptive orthodontics which in turn is one of the major responsibilities of a pediatric dentist. [2] The most appropriate treatment plan should be the one which is acceptable and beneficial to the child, correct the condition with as less time and expenditure as possible. The presence of diastemas between anterior teeth is an esthetic problem for some patients. A frequent site of a diastema is between maxillary central incisors. causative factors include congenitally missing teeth, undersized or malformed teeth, interarch tooth size discrepancies (i.e., Bolton discrepancy), super-numerary teeth, and heredity. Diastemas also may result from other problems such as tongue thrusting, , or posterior bite collapse. [3]Diastemas should not be closed without first recognizing and treating the underlying cause, as merely treating the cause may correct the diastema.[4] The objective of the treatment should be conservative, economical, and comfortable to the patient, with satisfaction being the major treatment outcome.

This case report describes the economical easy management technique in a boy aged 11 years, for correction of midline diastema and anterior single tooth crossbite by a removable appliance incorporating a split labial bow and a Z-spring, respectively and correcting both problems simultaneously with single appliance in 4 months.

Case Report

A boy aged 11 years accompanied by his father reported to the Department of Pedodontics & Preventive Dentistry with the chief complaint of spacing between front teeth and irregular teeth since 3 yrs. The childwas physically healthywith behaviorr a t i n g 4 o n Frankl's behavior rating scale and without any contributing health history. On extraoral examination, therew e r e no observable abnormalities. There was no relevant past medical & dental history found. with potentially competent lips.

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On clinical examination

It was found that there was midline diastema of 4mm between upper central incisors with 22 in crossbite& an angle's class I molar relation bilaterally. Intraorally frenal attachment was not high neither in xray was there any mesiodens. After careful intraoral examination, it was decided to treat the case with removable "Hawley's appliance incorporating split labial bow with single arm component and a z spring to push the palatally placed upper incisor labially". Bite was open by placing composite filling stops in molar region.

The Treatment Objectives: To achieve the midline space closure and the normal overbite & overjet of the left upper lateral incisor which is in crossbite and aligning the inclination of the anterior tooth which could further improves the patient's facial & dental profile. The success & prognosis of this treatment is immensely dependent on children's cooperation & parental guidance.

Procedure:

Immediate treatment: This includes educating patient& parents about the use of appliance planned to be given for the midline diastema closure and crossbite rectification. It also included thorough oral prophylaxis.

Definitive Treatment: Alginate impression was made for both the arches and immediately poured with dental stone. Hawley's appliance with split labial bow and double cantilever springfor 22 was made for rectifying midline diastema and crossbite respectively. This appliance is known to deliver slow-lightcontinuous force. The removable appliance was inserted in the patient's mouth and the patient was trained to insert & take out the appliance on his own under parental guidance. The patient was recalled after 24 hours to check the fitting of the appliance (Figure 1, 2,3).

Firstly he was recalled every week for the activation of split labial bow. He was made to wear it full time and for this the split labial bow arm was curved like a hook around 21 and also fixed with composite restorative material to secure it at place. In the 4th week, midline diastema was found to be corrected (Figure 4,5).Then after 4 weeks appliance was taken out cleaned and activation of dounle cantilever spring by opening 1mm was done and then appliance again placed in the mouth. Bite upto an optimum level was opened by placing composite stops on molars. After 2 weeks, crossbite was seen to be corrected. Hawley's appliance with z spring sustained for another 2weeks. After which sectional bracketing was done by bonding upper anterior with bond-bracket slot0.18" standard edgewise and inserting round NiTi wire of days 0.14" for 6 weeks for final finished occlusion(Figure 6,7,). As cross bite correction is self retaining hence retainers were not recommended. Patient was on followup for 1 yr and no relapsed was noticed.

Fig 1- Preop picture depicting midline diastema with single tooth cross bite

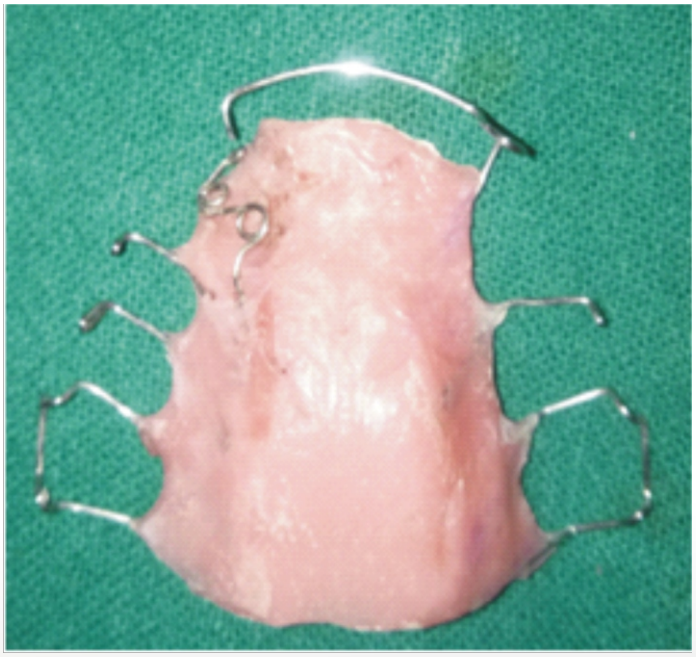

Fig 2 Constructed hawleys appliance with single arm split labial bow and double cantilever

Fig 3- Insertion of appliance in the patients mouth

Fig 4- Showing bonded split labial bow with composite

Fig 5 - Showing bite opened with composite for giving space for correcting cross bite

Fig 6,7- Show sectional bracketing to upper anterior to achieve finished alignement

Discussion

An important factor to consider in orthodontic treatment is whether to use a removable or a fixed appliance. Treatment involving removable appliances will ensure maintenance of good oral hygiene.[5]They reduce chairside time during treatment as they are fabricated in the laboratory. However chances of breakage, losing the appliance and need for good cooperation from patients and supervision of parents are some of the drawbacks (Bell et al, 2011). With regards to fixed therapy, the advantages over removable type of appliance are significant and includes lesser bulk, lesser chairside time, bodily tooth movement, better control, and lesser treatment time. However, they increase the chair side time needed and require specialized training(Bhalajhi, 2006).In this case, a removable hawleys appliance was used, both split labial bow component and double cantilever spring was incorporated. The arm of the split labial bow was curved to act as a hook to engage the distal side of the central incisor to be moved in the direction of activation that would create the space for the palatally positioned adjoining lateral incisor which is also in crossbite. After complete closure of the midline diastema automatically optimum space required for the palatally placed lateral incisor to move labially was created. Then the bite was opened and double cantilever spring activation was done and crossbite was corrected. Then the final finished aligment was achieved by sectional bracketing technique.

Achieving and ensuring perfect teeth alignment and aesthetics in a developing dentition are not the duties of paediatric dentists. The role of paediatric dentists is to minimise the detrimental effects caused by malocclusion in the developing dentition and facilitate an easy transition of care to orthodontists later.[6]Paediatric dentists and orthodontists should work hand in hand to streamline what is achievable during growing phases of the dentitions concerning interceptive orthodontics. Knowledge on the mechanics of fixed orthodontic is useful for paediatric dentists. The knowledge will allow paediatric dentists to improvise treatment methods to address the challenges faced when the use of a removable appliance meets its limits

Anterior crossbite should be treated as soon as it is diagnosed with the help of simple appliances depending on the cooperation and compliance of the patient. Selection of treatment plan for crossbite correction should be based on the principles formulated by Lee that includes the presence of Class I occlusion, adequate space to reposition the tooth in the arch, sufficient overbite to hold the tooth in position following correction, and the apical position of the tooth in crossbite that is the same as it would be if the tooth was in normal occlusion. Some of the treatment approaches are the extraction of retained tooth, tongue blade therapy, inclined planes, a reverse stainless steel crown, and removable and fixed appliances.

According to Keene (1963), midline diastema is defined as anterior midline spacing >0.5 mm between the proximal surfaces of the anterior teeth. It has a multifactorial etiology where both the genetics (autosomal dominant trait), as well as environmental factors play an important role. Some of the causes include a frenum, midline bony clefts, dentoalveolar diastemas associated with normal growth and development, pernicious habits, muscular imbalances in the oral region, physical impediment, and abnormal maxillary arch structure. The treatment options range from simple, spontaneous closure after the removal of the underlying cause to more comprehensive orthodontic therapy. [7] When orthodontic correction is not indicated, the diastema can be closed with direct composite resin restorations. The success in treating diastema depends on accurate diagnosis and treatment of the specific etiology or etiologies, pretreatment consideration of appropriate orthodontic objectives, and long-term retention and stability.

Malposition teeth if left untreated lead to complications in the developing dentition which may be detrimental to either the dental functions or the dental aesthetics. Common problems encountered are issues related to loss of space due to migration of adjacent teeth into the available space, traumatic bite on opposing teeth that lead to gum recession and mobility of teeth; and attrition of enamel surface of the opposing teeth in contact. Complications such deviation of the jaw and temporomandibular joint problems are common if premature contact on occluding teeth found. Other issues include difficulty in maintaining oral hygiene such as brushing and flossing around the misaligned teeth that give rise to caries and gingivae problems.

Conclusion

The results were acceptable and steady while the treatment objectives were obtained within a short duration using this technique and there was an improvement in patient's smile.This case shows use of economical removable appliance incorporating 2 components which simultaneously corrected the malocclusion. Along with using sectional bracketing technique to finish the look.

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