ORTHODONTIC INTERVENTION IN MIXED DENTITION: A BOON FOR PEDIATRIC PATIENTS

Meenu Bhola, Taruna Gera

Professor and Head, Assistant Professor, Department of Pedodontics and Preventive dentistry, Dashmesh Institute of Research and Dental Sciences, Faridkot.

Abstract

Orthodontic intervention in the mixed dentition does not always prevent orthodontic treatment in the permanent dentition; however, there can be significant advantages to early intervention. Identifying certain problems at an early age offers a possibility either to redirect skeletal growth or to improve the occlusal relationship. The primary objective of managing orthodontic problems in the mixed dentition stage is to intercept or correct malocclusions that would otherwise become progressively more complex in the permanent dentition or result in skeletal anomalies.

Keywords: Anterior Crossbite, Sectional fixed appliance, Posterior bite plane

INTRODUCTION

A stage of transition from primary to permanent dentition is the time period which mainly presents with malocclusion due to various factors. Among the development problem most frequently seen in the mixed dentition period is the anterior cross bite.\[^{1,2}\]

This transition period has always been in the controversy regarding the time to initiate the treatment and type of treatment to be undertaken. Interceptive procedures not only simplify but also eliminate the need for later treatment procedure. Mixed dentition is the most crucial period because early treatment could not only correct the occlusion but can also ensure normal development of teeth and jaws. Most important advantage of early interception is that the majority of the
malocclusion can be corrected non surgically and without extraction of permanent teeth.[3,4] Anterior dental crossbite is described as the condition as when the maxillary and mandibular teeth are in abnormal labiolingual relationship when the teeth are in centric occlusion. Crossbite may lead to abnormal enamel abrasion of lower incisor, thinning of labial alveolar plate with gingival recession, fracture of tooth, TMJ disturbances, periodontal pathosis (Valentine et al, 1970) (Lee 1978). The present case report describes a method of treating anterior crossbite with narrow shaped arch using jack screw incorporated in acrylic, double cantilever spring along with posterior bite plane followed by arch alignment using 2 x 6 appliance during the mixed dentition phase.

CASE REPORT
A 10 year old female reported to the Department Of Pedodontics and Preventive Dentistry, Dasmesh Institute of Research and Dental Sciences, Faridkot with a chief complaint of irregularly placed upper front teeth since 3 years. The medical and dental histories were non- contributory. Extra oral examination revealed straight profile of the patient (Fig 1). Intra oral examination revealed V-shaped arch with Class I molar relationship and maxillary right lateral incisor was lingually locked (Fig 2). Orthopantomograph of the patient was taken (Fig 3) and space analysis was done to measure the arch length discrepancy. After doing Pont’s analysis, discrepancy had been found between the tooth material and arch length. Hence, it was decided to carry out the arch expansion. Arch expansion was done with the help of jack screw (Fig 4). A screw was incorporated in the acrylic plate and was activated 0.25 mm after 7 days for 8 weeks. After 2 months follow up, the arch expansion increased from 24.5 mm to 26.5 mm (Fig 5).
After the desired arch expansion was achieved, next step was to treat single anterior tooth crossbite in relation to tooth number #12. Next step was to treat single tooth anterior crossbite. For that double cantilever spring along with posterior bite plane was fabricated (Fig 6). In this case Z-spring was used as now we had adequate space for the labialization of the maxillary lateral incisor. The patient was recalled after one week and the double cantilever spring was activated and the desired results were seen within four weeks (Fig 7). After crossbite correction, third aim was to bring all the maxillary teeth into the alignment. After having treated the case with jack screw on maxillary incisors, the fine adjustments of alignment and consolidation of overjet and overbite was obtained by partial fixed appliance which was a 2 x 6 appliance. It engages both of the maxillary first permanent molars and central incisors, lateral incisors and canines. Arch alignment was achieved with the help of 2 x 6 appliance. This fixed appliance comprised of bands on the first permanent molars and bonds on the erupted maxillary anteriors. 0.022” slot brackets were bonded onto the six anterior teeth. A 0.016” nickel titanium arch wire was used for the alignment of incisors. Transpalatal arch was given for the stabilization of arch. (Fig 8) 0.018” NiTi wire then replaced the initial wire and was kept there till was no deflection was seen in wire. Final correction and alignment of the upper front teeth was seen after one month follow up (Fig 9 &10).
DISCUSSION
Mixed dentition stage is a stage of transition from primary to permanent, has always been in controversy regarding the time of initiation of treatment and the type of treatment to be given. Main goal of pediatric dentistry is not only to maintain but also to improve arch integrity so as to allow the eruption of permanent teeth and prevent the development of more complicated malocclusion.[5] Interceptive procedures should be widely used in mixed dentition period for the correction of developing abnormalities. White states that anterior and posterior crossbites require early treatment for functional reasons and anterior crossbites
for aesthetic reasons. Mixed dentition treatment offer advantages in stability.[6] Yang and Kiyak surveyed orthodontists, most of who were in private practice in the USA, regarding their preferences on treatment timing for crossbites. Approximately 80% stated that they would treat anterior crossbites as well as ectopic development and delayed eruption of the incisors in the early mixed dentition.[7]

Anterior cross bite is the condition which is use to define an occlusal problem which involve palatal malposition of maxillary incisors resulting from a lingual eruption path. It has a reported incidence of 4-5%.[8] Anterior cross bite can be either skeletal or dental in origin. Anterior dental cross bite originates from abnormal axial inclination of maxillary anterior teeth. Cross bite is the condition which should be corrected as soon as it is detected as the maxillary incisors get locked behind the mandibular incisors. Early treatment can reestablish proper muscle balance and a well balance occlusal development.[9]

Kharbanda et al in 1991 have reported that in Delhi about 36.6% of malocclusions were seen in the age group of 5-13 years school children. 9.5% of these malocclusions were crowding in the maxillary anterior region and anterior cross bite.[10]

The ideal age for the correction of anterior dental crossbite is between 8 to 11 years during which the root is being formed and the tooth is in the active stage of eruption. Delayed treatment of anterior crossbite can lead to serious complications such as: [11,12]

1) Loss of arch length.
2) Traumatic occlusion.
3) Gingival stripping of the lower incisors.
4) Periodontal pocket formation.
5) Wear facets on labial surface of maxillary incisors

There are different modalities for the correction in the early mixed dentition period for the correction of anterior dental cross bite. It can be Hawley’s retainer with anterior Z spring, bonded composite resin slope, tongue blade therapy, reverse stainless steel crowns. Removable appliance is a good treatment option for correction of anterior tooth malposition and also ensures good compliance and maintenance of good oral hygiene. To interdict the developing malocclusion is the major responsibility of a Pedodontist. However there are few limitations of removable appliances The active component of a removable appliance provides only a point contact and the tooth movement is principally by tipping. For this reason, removable appliances are not effective for bodily moving teeth if space needs to be created for an instanding incisor.[13,14]

The present case had anterior cross bite with no skeletal abnormality. The facial profile and occlusion was Class I and there was inadequate space in the arch for crossbite correction. So there was need for arch expansion which was done with jack screw incorporated in acrylic appliance and dental crossbite was corrected by double cantilever spring along with posterior bite plane. After that, arch alignment was carried out with the help of 2 x 6 sectional fixed appliance. A 2 x 6 sectional fixed appliance is the most effective and efficient tooth positioning versatile technique as it allows three dimensional control of the involved teeth during correction of anterior crossbite and aligning ectopic incisors. Rotations, diastemas and incorrect tooth inclinations and angulations can also be treated very quickly and accurately.[4] In the present case report, patient was able to maintain an adequate standard of oral hygiene and correction was completed more rapidly.

**CONCLUSION**

The main emphasis should be placed on the diagnosis and evaluation of the malocclusion with consideration on the
facial profile and whether the child is benefited from the treatment at this early stage of development. Removable appliances and partial fixed treatment are the options which help in early correction of simple and minor malocclusions. As a part of interceptive orthodontic procedure the anterior cross-bite was corrected more rapidly than could have been achieved with other appliances. Early treatment in such cases will not only quickly restore anterior aesthetics but may also reduce the complexity and duration of any subsequent treatment required.

REFERENCES

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