Rapid Correction of Anterior Cross bite using a Fixed Appliance: A Case Report

[1]Dr. Akash Bakal, [2]Dr. Pankaj Chavhan, [3]Dr. Arunkumar Sajjanar, [4]Dr. Vaidehi Awari, [5]Dr. Anand Deo, [6]Dr. Shyam Chandak

[1,4,5,6]PGstudent, [2]Reader and PG Guide, [3]Professor and HOD, Department of Pediatric and Preventive Dentistry, Swargiya Dadasaheb Kalmegh Smruti Dental College and Hospital Nagpur, Maharashtra, India

CorrespondingAuthor:Dr. Akash Bakal

aakashbakal@gmail.com

ABSTRACT

Crossbite can be treated using both removable and fixed appliances. The report of a case usingfixed 2X4 appliance approach to treat an anterior single tooth in a crossbite that is locked out ofarchformwithasimplefixedpartialappliance iscoveredinthispaper.The2x4appliance consistsof bands on the first permanent maxillary molars, bonded brackets on the maxillary incisors, anda continuous archwire inserted into buccal tubes of the molar bands Orthodontic treatment wasinitiated by using MBT brackets and nitinol archwire alignment. Treatment objectives wereachieved,andestheticsandocclusionweremaintainedpostoperatively.Treatmentobjectivesw ereobtained within a short duration using this technique, and there was an improvement in patients'smile.

Keywords-Anteriorcrossbite,2X4appliance,fixedappliance,Ni-tiwire,mixeddentition.

INTRODUCTION

Anteriorcrossbiteisthetermusedtodefinethemalocclusionthatresultsinmaxillaryanterior teeth being positioned behind of mandibular anterior teeth. Its prevalence varies between2.2%and 36%in different countries aroundthe world(1).

Anterior crossbites can be either dental or skeletal in origin, whereas, anterior dental crossbitesoriginate from the abnormal axial inclination of the maxillary anterior teeth. Anterior skeletalcrossbitesaremostoftenassociatedwithaskeletalproblem,suchasmandibularprognathism andmidface deficiency(2). dental versus skeletal anterior crossbite is essential in determining clinicaltreatment and can be differential diagnosis by guiding the mandible into a centric relation andevaluating the molar and incisor relationship: If the molars are in a Class I relationship and theincisors in an edge-to-edge relationship, a dental correction can be undertaken(3). Anterior dentalcrossbite has a reported incidence of 4-5% and is usually the result of a palatal malposition of themaxillary incisors(4) resulting from a lingual eruption path. Other etiological factors includetrauma to the primary maxillary incisors resulting in lingual displacement of the permanent toothbuds; presence of supernumerary anterior teeth; crowding in the incisor region; a habit of bitingthe upper lip; an over-retained, necrotic or pulp less deciduous tooth or root; delayed exfoliationoftheprimary incisors; and odontomas(3,5).

Itwasexpressedthattheappearanceofanteriorcrossbiteintensifieswiththeeruptionofpermanenttee th.(1) It is known that anterior crossbite is caused by conditions such as supernumerary teeth,odontomas, persistent primary teeth, traumatized primary incisor teeth, lip biting habit,

and lackof space(1,4). Early diagnosis and treatment of anterior crossbite cases are recommended topreventtoothwear,anteriortoothfractures,gumproblems,andtemporomandibularjointdisorders andto achieveabetter functional occlusion and esthetics(6).

The main goal in treating anterior dental crossbite is to tip the affected maxillarytooth or teeth labially to a point where a stable overbite relationship prevents relapse. Treatmentmay involve lingual movement of a mandibular tooth, labial movement of a maxillary tooth, orboth(3).Varioustechniqueshavebeenusedtoachievethisgoal,suchastongueblades,compositein clinedplanes,reversedstainlesssteelcrowns,removableacrylicappliances with lingualsprings and fixed appliances(7,8). In addition to being inexpensive and not causing damage to associatedsoft-tissue, given the young ages of patients, removable appliances should also be easy to placeandremove,comfortableand easily tolerated(3,9).

Although it has been reported that factors such as child's age, number of teeth to be repositioned,totalnumberofteeth,statusofocclusion,andmotivationofchildandparentsshouldbec onsideredin deciding which of these methods to be used, clinicians occasionally experience dilemmas inchoosing themethod.(8)

CASE REPORT

An8-year-oldboyreportedtothePedodonticsOP,withachiefcomplaintofirregularlyplacedupper front teeth since 1 year and also parent was esthetically concerned, therefore wantedtreatment for the same. The patient had no significant medical or dental history. No abnormalitywas detected on extraoral examination. Intraoral examination revealed permanent maxillary leftcentral incisor in crossbite with Angle's Class I molar relation [Figure 1]. OPG was taken for anyextra tooth (Mesiodens) and position of erupting canine [Figure 2].Space analysis was done,showed that the maxillary arch had 0.5 mm arch length discrepancy. Treatment planned was tocreate0.5mmspaceforthemaxillaryleftcentralincisorandcorrectthemisalignment.Treatmentwa s started in the maxillary arch by bonding MBT brackets to the maxillary central incisors andmolarbandswithpreweldedbuccaltubetothemaxillaryfirstmolarsmaxillaryleftcentralincisor was also bonded with MBT bracket, and a 0.016" round nitinol archwire was used for labialmovement and alignment of the maxillary left central incisor. To raise the bite, glass ionomercement (GIC) of 2 mm thickness was placed on the occlusal aspect of posterior tooth, so as toachieve a 2 mm incisal clearance [Figure 3]. On recall of the patient after 1 week, marked toothmovementwasnotedinrelationto21.After2weeks,thecrossbitewascompletelycorrected.The GICplacedon36and46wereremoved usinganultrasonic scaler. Thewire wasthenchangedto 0.017 × 0.022" Niti and retained for another 2 weeks followed by debonding. The patient wasfurtherrecalledafter1weekforfollow-upandfurthertreatmentsandtheGICwasremovedinthePosteriorRegion. [Figure4].

Fig1-Pretreatmentintraoralphotograph

Fig2-OPG

Fig3-2X4bracketplaced withbiteraise withGIC

Fig4–postoperativephotograph.

DISCUSSION

One of the main goals of pediatric dentistry is to maintain or improve archintegrity to allow for the eruption of permanent teeth and prevent the development of a morecomplicated malocclusion. Anterior dental crossbite is a rare condition that is of major estheticand functional concern to children and parents and that seldom corrects itself(3). However,developing Class III patients with moderate to severe anterior crossbite and deep bite may needearly intervention. The ideal age to treat anterior crossbite is between 8 years and 11 years, theperiod when the root is being formed and the tooth is in the active stage of eruption(8).

Anteriordentalcrossbiteisahabitualestablishedcrossbiteofanteriorteeth,withoutanyskeletaldiscrepancy,resultingfromfunctionalforwardshiftofthemandibleonclosure.Whenthemandible is guided into a normal centric relation, a normal overjet or an edge-to-edge position ofincisorscanbeobtained.Ifcorrectionisdelayedtoalaterstageofmaturity,itmayleadtoaskeletalmalocclusionand requiremorecomplex treatment.

It is useful to have guidelines as to which anterior crossbites are amenable to correction in themixed dentition. Each case must be assessed on its merits and due consideration must be given tothepresenceorabsenceofamandibulardisplacementonclosing.Acrossbiteshouldbecorrectedearly when it is causing damage either to specific teeth within the dentition or to the occlusionitself.Theaimistomoveindividualteethawayfromapositioninwhichtoothwearorperiodontaldamagemaybeoccurringortopreventestablishmentofthepermanentdentitioninapositionin whichthemandibleisdisplaced.(2)Theremustbeenoughspaceavailabletocorrectthecrossbite;in some cases, it may be necessary to extract deciduous canines to provide sufficient space intowhich displaced incisor teeth can be moved. Due consideration must also be given to the positionof the permanent canine and practitioners should be certain that no damage will occur to theunerupted canine as a result of movement of the displaced crown, and inevitably the displacedroot, of lateral incisors. A major factor determining the success of early crossbite correction iswhether or not a positive overbite can be achieved. (9) If a positive overbite can be establishedthen the prognosis for maintaining the corrected crossbite is good: the result should be stable andnofurtherretentionshouldberequired.Ifapositiveoverbitecannotbeprovided,asimplebondedretainer placed on the palatal surfaces of two upper incisors is normally sufficient to maintain thetoothin thecorrectedposition until theocclusion becomes moreestablished.(4)

CONCLUSION

Most incisors in crossbite are managed with removable appliances. However, in view of theadvantages outlined in this paper, following appropriate case assessment, practitioners may wishtoconsider using fixed appliances to managesomecases.

FINANCIALSUPPORTANDSPONSORSHIP

Nil.

CONFLICTSOFINTEREST

Therearenoconflictsofinterest.

REFERENCES

1. CeyhanD,AkdikC.Takingaglance atanterior crossbiteinchildren:Caseseries.ContempClinDent. 2017;8(4):679.
2. UlusoyA,BodrumluE.Managementofanterior dentalcrossbitewithremovableappliances.ContempClin Dent. 2013;4(2):223.
3. Park JH, Kim TW. Anterior Crossbite Correction with a Series of Clear

RemovableAppliances:A CaseReport. J EsthetRestor Dent. 2009 Jun;21(3):149–59.
4. Major PW, Glover K. Treatment of anterior cross-bites in the early mixed dentition. J CanDentAssoc. 1992;58(7):574–5.
5. HeikinheimoK,SalmiK,MyllärniemiS.Longtermevaluationoforthodonticdiagnosesmadeat theages of 7 and10 years. Eur JOrthod.1987;9(2):151–9.
6. EstreiaF, AlmerichJ,GasconF. Interceptivecorrectionofanteriorcrossbite.JClinPediatrDent.1991;15(3):157–9.
7. VadiakasG, ViazisAD. Anteriorcrossbite correctionintheearlydeciduousdentition.AmJOrthodDentofacial Orthop.1992;102(2):160–2.
8. KiyakHA.Patients'and parents'expectationsfromearlytreatment.AmJOrthodDentofacialOrthop.2006;129(4): S50–4.
9. SariS,Gokalp H,Aras S.Correction ofanteriordentalcrossbitewith compositeas aninclinedplane.Int JPaediatrDent. 2001;11(3):201–8.