ORIGINAL RESEARCH PAPER

Volume-7 | Issue-6 | June-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CORRECTION OF UNILATERAL CROSSBITE WITH MODIFIED QUAD HELIX : A CASE REPORT

Dental Science

Dr.Patil S Vishwanath Department of Orthodontics, HKE's SN Dental College, Kalaburagi. Karnataka

Dr. Patil B C* Department of Orthodontics, HKE's SN Dental College, Kalaburagi. Karnataka *Corresponding Author

Dr.Siddiqui A Mohammed Department of Orthodontics, HKE's SN Dental College, Kalaburagi. Karnataka

Dr.Wilson E Shilpa Department of Orthodontics, HKE's SN Dental College, Kalaburagi. Karnataka

ABSTRACT

Anterior cross bite is one of the most common problem in dentistry. It is referred as an emergency in orthodontics as well. Anterior crossbite may lead to abnormal enamel abrasion or proclination of the mandibular incisors, which, in turn, leads to thinning of the labial alveolar plate and/or gingival recession. The present article introduces a simple fixed appliance, the modified quad helix as a viable alternative to carry out treatment of incisor crossbite in non- compliant patient.

KEYWORDS

Anterior Crossbite, Modified Quad Helix

INTRODUCTION

An anterior crossbite is present when one or more of the upper incisors are in linguo-occlusion (reverse overjet). This may involve just a single tooth or could include all four upper incisors. Anterior dental crossbite has a reported incidence of 4-5% and usually becomes evident during the early mixed dentition Phase.[1] It results from a variety of factors such as palatal eruption of the maxillary incisors, trauma to the primary incisors, supernumerary anterior teeth, over retained primary teeth, odontomas, crowding in the incisor region, and inadequate arch length.[2]

The clinician should determine whether the crossbite is skeletal or dental in origin from the profile analysis and intra oral findings. Dental -type anterior crossbites usually exist in those patients where:

1. The molars and cuspids are in Class 1 relationship.
2. The crossbite involves only one or two teeth.
3. The profile of the patient is generally normal and the same when the mandible is at rest.
4. The teeth are occluded, and the tooth or teeth are involved in the crossbite exhibit only an abnormal lingual axial inclination usually in the presence of a causative factor.[3]

Anterior cross bite is one of the most common problem in dentistry. It is referred as an emergency in orthodontics as well.[4] Anterior crossbite may lead to abnormal enamel abrasion or proclination of the mandibular incisors, which, in turn, leads to thinning of the labial alveolar plate and/or gingival recession. Mandibular shift caused by abnormal mandibular movements may place strain on the orofacial structures, causing adverse effects on the temporomandibular joints and masticatory system. Spontaneous correction of such malocclusion has been reported to be too low to justify non-intervention. [2] The problems of anterior crossbite in permanent dentition show progression in severity, so an early intervention should aim at stimulating well balance growth and occlusal development.[4]

As the treatment is carried out with removable appliances, good co-operation of the patient is one of the most important conditions for successful treatment results. The present article introduces a simple fixed appliance as a viable alternative to carry out treatment of incisor crossbite in non- compliant patient.

CASE REPORT

A 15 year old female patient, with any non-contributary medical history showed up to the Department of Orthodontics and Dentofacial Orthopaedics. Her major complaints comprised of irregulary arranged teeth and unpleasant smile. Patient gave the history of trauma from occlusion before 3 years. At that point, the tooth was partially restored and remained as so with neither apical radiolucency nor sensibility until her first orthodontic appointment.

On intraoral examination, slight swelling extending palatally from 21 to 26 was noticed along with discolouration of 21, 22. Evaluation of occlusal radiograph revealed a well defined periapical radiolucency of approximately 4 cm in diameter involving left maxillary anteriors -21, 22 with an open apex irt 21. Clinical examination revealed no evident skeletal disharmony, Angle Class I molar relationship with a normal overbite and overjet, anterior crossbite wrt 11, 12, constriction in the premolar region and slight rotations. (Fig:1 A,B,C)

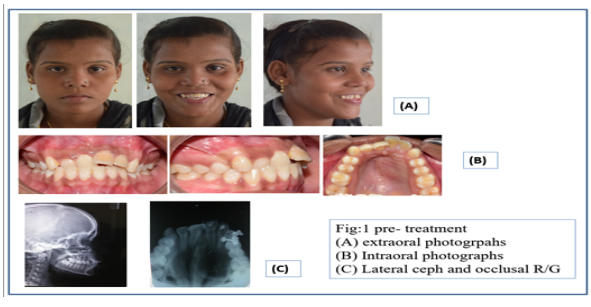

Fig:1 pre- treatment
(A) extraoral photogrpahs
(B) Intraoral photographs
(C) Lateral ceph and occlusal R/G

TREATMENT PLAN

Before starting orthodontic treatment, an endodontic consultation was required. The endodontic examination revealed that the upper central incisors were nonresponsive to electronic and thermal pulp testing whilst adjacent teeth presented physiological responses. A diagnosis of pulp necrosis of traumatic origin with extensive radicular cyst was established. Surgical enucleation of the cyst was planned followed by root canal treatment wrt.21 and 22. This multidisciplinary approach was then followed by fixed mechanotherapy after a period of 2 months. An early interceptive treatment approach was essential to alleviate anterior crossbite in the above said patient. This can be achieved either with a removable expansion appliance with jack screw or a fixed appliance such as hexa helix. Removable appliances were not preferred in these situations as they tend to get displaced as the turning frequency decreases following activation. Moreover, poor patient compliance with removable appliance can cause relapse of the previous expansion and poor success rate. Therefore, a fixed appliance was chosen.

APPLIANCE DESIGN

The fixed appliance planned was mono helix; a modification of quad

helix in which anterior crossbites can get corrected . The traditional quad helix consists of a pair of anterior helices and posterior helices. The free wire ends adjacent to the posterior helices are called outer arms. They rest against the lingual surface of the posterior teeth and are soldered on to the lingual aspect of the molar bands. In our case, we incorporated just one helix of the traditional design on the side with the anterior crossbite. This single helix was utilized to correct the anterior crossbite. (figure: 2 (a))

TREATMENT PROGRESS

Orthodontic bands were adapted on either side of maxillary permanent first molars and right first premolar, followed by fabrication of appliance with 0.036 stainless steel wire as per the above mentioned design. Then the modified quad helix design with single helix was adapted along with the TPA into the lingual sheath.(fig:2a) The appliance was activated prior to insertion and then cemented. Activation was done for every 25 days for 4 months. A posterior bite plane using glass ionomer cement was placed on the occlusal surfaces of mandibular posterior teeth for the time being to make the bite open anteriorly so that the anterior teeth that are in crossbite can be moved labially, following which they were removed. Within a period of 12 weeks almost all the anterior teeth were corrected out of crossbite (fig:2b) and later brackets were bonded on maxillary anteriors (canine to canine) for further alignment of teeth which took approximately 4 months (fig:2c). The total duration of treatment was 8 months, after which ceramic bridge (2 unit) was placed on maxillary incisors (21,22) followed with bonded lingual retainer.

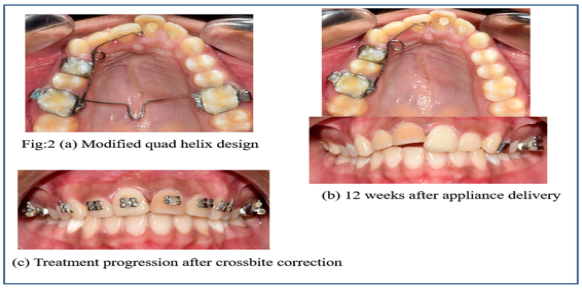

Fig:2 (a) Modified quad helix design

(b) 12 weeks after appliance delivery

(c) Treatment progression after crossbite correction

DISCUSSION

Anterior dental crossbite is a habitual established crossbite of anterior teeth, without any skeletal discrepancy, resulting from functional forward shift of the mandible on closure. When the mandible is guided into a normal centric relation, a normal overjet or an edge-to- edge position of incisors can be obtained. If correction is delayed to a later stage of maturity, it may lead to a skeletal malocclusion and require more complex treatment which exactly happened in this case. Different treatment modalities have been used to correct anterior dental crossbite, including tongue blades, composite inclined planes, reversed stainless steel crowns, removable acrylic appliances with lingual springs and fixed appliances.

According to Graber TM the most basic form of treatment for anterior crossbite is the tongue blade, in which the patient is instructed to bite on during leisure hours. The biting force is applied to the lingual aspect of the involved maxillary tooth to move the tooth forward, with the incisal edges of the mandibular teeth acting as a fulcrum to absorb the reciprocal lingual forces. However, this technique is rarely sufficient when more than one tooth is involved. Croll TP found out in his study that crossbite may also be corrected using a reversed, pre-fabricated stainless steel crown. The chief disadvantage with this treatment is the difficulty adapting a preformed crown to fit the tooth in crossbite. Furthermore, because of its unaesthetic appearance, this form of treatment is often rejected by children and their relatives.5

Fixed appliance treatment was chosen as it provides advantages such as minimal discomfort, reduces need for patient cooperation, better control of tooth movements, and cost effectiveness6. Ninou and Stephens7 stated that crossbites with a functional displacement require treatment and that a maxillary fixed appliance is their preferred technique. Moreover removable appliances have various disadvantages such as need for patient cooperation, difficulty in speech/eating decalcification, caries, palatal hyperplasia, fungal infections8.

Quad-helix is used as an expansion device because it is a very versatile appliance, with applications such as: molar rotation control, torque, and tipping control and incorrect activation leading to unhelpful results. It can also produce advancement in the incisor region and create greater anterior expansion, resulting in an improved arch form (taking advantage of the anterior arms that deliver a “sweeping action”)9. Quad-helix appliance can deliver sufficient forces to promote skeletal changes on maxillary bone in younger patients during deciduous and mixed dentitions phases10. In general, using the quad helix for treatment leads to skeletal changes in maxillary bone, when desired by the practitioner and indicated in the treatment objectives. Modification of quad was preferred in our case to correct anterior crossbite. Adjustments were made by simply changing the amount and frequency of the activations.

RESULTS

At treatment completion, patient's self-esteem had significantly improved. Good facial proportions were observed in frontal view, with patient's profile improved due to an increase in lip volume as a result of incisor protrusion. Anterior crossbite and discrepancy in upper arch were corrected by protrusion of upper incisors by modified quadhelix followed by fixed mechanotherapy. (fig:3)

Overjet and overbite were fully corrected, and the criteria for ideal functional occlusion were met. Lateral cephalogram and OPG, dental impressions and photographs confirmed the positive results. Treatment results were satisfactory, and the occlusal objectives were achieved. The final harmonious smile pleased the patient and improved herself-esteem and quality of life.

Fig:3 post-treatment extraoral and intraoral photogrphs

CONCLUSION

It should be emphasized that it is very important to correct crossbites at an early age, reducing the need for long term orthodontic therapy in the future. The case report described clearly demonstrates the use of Mono helix (modified quad helix) appliance in correcting anterior crossbites in adult. The advantages of this appliance are significant and include simple design, easy construction, minimal cost, and better results. For early treatment to be successful, the treatment timing and treatment method should exhibit proven positive results. This appliance design could help general practitioners and paediatric dentists in managing similar malocclusions.

REFERENCES:

1. Yaseen SM, Acharya R. Hexa helix: modified quad helix appliance to correct anterior and posterior crossbites in mixed dentition. Case reports in dentistry 2012;2012.
2. Bindayel NA. Simple removable appliances to correct anterior and posterior crossbite in mixed dentition: Case report. The Saudi dental journal 2012;24:105-13.
3. Chachra[1] S, Chaudhry P. Comparison of two approaches for the treatment of anterior cross bite 2010.
4. Soni UN, Dash S, Baldawa R, Toshniwal NG, Mani S. Cost effective dual approach treatment: anterior crossbite. Pravara Medical Review 2016;8:27-9.
5. Bayrak S, Tune ES. Treatment of Anterior Dental Crossbite using Bonded Resin – Composite slopes: Case reports. Eur J Dent. 2008;2:303-6.
6. R. Ranta. Treatment of unilateral posterior crossbite: comparisonof the quad-helix and removable plate. ASDC Journal of Dentistry for Children 1988;55:102-4.
7. S. Ninou and C. Stephens. The early treatment of posterior crossbites: a review of continuing controversies. Dental Update 1994;21:420-6.
8. P. Dowsing and P. J. Sandler.How to effectively use a 2 x 4 appliance. Journal of Orthodontics 2004;31:248-58.
9. Boysen B, Cour KL, Athanasiou AE, Gjessing PE. Three-dimensional evaluation of dentoskeletal changes after posterior cross-bite correction by quad-helix or removable appliances. British journal of orthodontics 1992;19:97-107.
10. Chaconas SJ, y Levy JA. Orthopedic and orthodontic applications of the quad-helix appliance. American Journal of Orthodontics and Dentofacial Orthopedics 1977;72:422-8.