Anterior Crossbite Treatment Made Simpler-with Glass Ionomer Cement Blocks.

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Abstract

Anterior crossbites are often encountered in orthodontic practice.One or more teeth may be affected and the etiology can be dental,skeletal or dentoskeletal.

Crossbites of dental origin affect only some of the teeth in an area of the arch,and are less severe than crossbites due to jaw discrepancies but occlusal interferences often are present, increasing the chances of a shift on closure.

Correction of dental crossbites in the mixed dentition is recommended because it eliminates functional shifts and wears on the erupted permanent teeth and possibly dentoalveolar asymmetry.

This usually also increases arch circumference and provides more room for the permanent teeth. An untreated anterior crossbite may cause periodontal problems, while reports state that the mandible may grow disproportionality.

Relapse into crossbite is unlikely in the absence of a skeletal problem, so early correction also simplifies future treatment by eliminating the problem from the list.

Orthodontists have an armamentarium of devices, including removable appliances, expanders, fixed appliance and orthopaedic appliances such as the facemask for correcting the anterior crossbite.

Despite the variety of the afore-mentioned appliances, treating an anterior crosssbite early, can be a challenge.

We will discuss the effect of a simple, inexpensive and patient friendly approach we have found to work consistently well. At the same time, we will examine physiological changes that lead to successful treatment.

What can be better than allowing natural forces to play their role rather than going for complex mechanical devices to correct a malocclusion!

Introduction

Anterior crossbite is defined as a malocclusion resulting from the lingual position of the maxillary anterior teeth in relationship with the mandibular anterior teeth[1].Anterior crossbites are often encountered in orthodontic practice. One or more teeth may be affected and the etiology can be dental,skeletal or dentoskeletal[2].

This type of malocclusion is represented in 27% of the transverse and vertical malocclusions noticed[3]. A variety of factors have been reported to cause a dental anterior crossbite, including a lingual eruption path of the maxillary anterior teeth, trauma to the deciduous dentition in which there is displacement of the tooth buds, delayed eruption of the deciduous dentition, supernumerary teeth, and inadequate arch length[4,5].

Early treatment is directed towards preventing dysplastic growth of both the skeletal and the dentoalveolar components. In addition,it prevents excessive, abnormal wear of the labial surfaces of the maxillary incisors and the incisal edges of both the maxillary and the mandibular incisors. It avoids the risk of periodontal problems in the mandibular incisors because of traumatic forces that become higher as the muscles of mastication become stronger with age and the bite deepens[1,6]. Early treatment also alleviates functional posterior crossbites that can develop as a result of tooth interferences and incorrect occlusion[1]. Since crossbites are seldom self correcting, because of the relationship of the permanent to primary predecessors, early treatment can re-establish proper muscle balance, and thus preventing adjustment of the jaw muscles on the position resulting from the habitual posturing of the mandible.

Differential diagnosis of dental versus skeletal anterior crossbite is essential in the selection of cases that can be treated. To differentiate dental from skeletal crossbite , one should attempt to guide the mandible in centric relation and evaluate the molar and incisor relationship, as well as estimate the relative size of the mandible compared with the maxilla. If the molars are in a class I relationship and the incisors at an end to end relationship, a dental correction can be undertaken.

Selection of the appliance for correction of the crossbite is essential for successful treatment. The appliances suggested in the literature for correction of anterior crossbites in mixed dentition can be in the form of mandibular acrylic inclined planes, reverse stainless steel crowns, tongue blade therapy, removable plate with screws or auxillary springs or fixed light archwires[7,8,9].

The force exerted by appliances like acrylic inclined planes, tongue blade therapy etc. is dependent on the chewing action of the patient and therefore is unpredictable. Furthermore, the heavy forces exerted can traumatize the teeth .In addition, although easily accepted ,stainless steel crowns are quite unesthetic[10] .The patient's compliance is essential for successful treatment ,especially in the young child and may resist any kind of treatment. Elimination of this factor favours the use of fixed appliances. Myers[11] found that poor patient cooperation resulted in discontinuation of 12% of the removable appliances but only 4% of the fixed appliances.Also,12% of the removable appliances were lost compared with only 1% of the fixed appliances.

The technique discussed here is a simple, inexpensive, and patient friendly approach we have found to work consistently well; by the action of physiological forces which led to the successful results without the use of any form of external forces.

Method And Materials

The method consists of bilaterally building the occlusal surfaces of mandibular deciduous and permanent first molars with coloured glass ionomer cement (Ultrabandlok) this cement is known for its strength and ability to release fluoride and due to its blue colour, it is easily distinguishable from the tooth surface to facilitate its sequential trimming and removal. There is no need to etch or prime the teeth before applying the cement and the clinician can easily equilibriate the two buccal of the cement so that molars on both sides occlude evenly. If more cement is needed during the course of treatment, it can be easily applied over the existing layer. Patients and parents are advised, if the blocks come off, they need to make an urgent appointment for their replacement. Patient generally get used to chewing with blocks quickly because blocks are extended over 2-3 teeth so that mastication is easier and [illegible] is avoided. Patients are advised to avoid sticky foods. Normal brushing and flossing are also encouraged.

Patients are scheduled for checkups every 15 days. After the maxillary and mandibular teeth come into their proper position, the cement can be easily removed. The patient [illegible] that the cement was bonded [illegible] within 2-3 months (Fig 1).

Clinical Cases

The following clinical cases depict how this method is implemented and its clinical results. The clinical method has been applied to anterior dental crossbites in mixed dentition patients.

Case 1

An eight year old boy was referred to the department of orthodontics due to an anterior crossbite of maxillary left permanent central incisor with complete reverse overbite in relation to its antagonist in the mandibular arch. The extra and intraoral photographs are displayed in fig 2. [illegible] glass ionomer cement was applied on the occlusal surfaces of mandibular deciduous second molars and permanent first molars as described above (fig 3). Two and a half months later anterior crossbite was corrected and the cement was removed. The patient's smile improved significantly (fig 4). As shown in fig 4 the posterior occlusion that was temporarily opened due to the buildups was corrected on its own after a period of two months. Fig 5 was taken 6 months after the completion of the treatment depicting the stability of the result.

Case 2

A seven year old girl presented with anterior crossbite of both maxillary permanent central incisors (fig 6). The same technique was used and the cement was added (fig 7). Two months later the crossbite was resolved (fig 8).

Case 3

An eight year old boy presented with an anterior crossbite of permanent maxillary left central incisor (fig 9). By building the occlusal surfaces of mandibular deciduous second molars and permanent first molars the crossbite was resolved in one and a half month (fig 10). A comparison of smiling and intraoral occlusal photographs before and after treatment is shown in fig 11.

Case 4

A 10 year old girl presented with an anterior crossbite of permanent maxillary right and left permanent lateral incisors with over-retained deciduous right lateral incisor (fig 12). Deciduous tooth was extracted and glass ionomer cement blocks were added on the occlusal surfaces of mandibular posterior teeth. Two months later the crossbite was corrected as shown in fig 13.

Case 5

This case depicts the implementation of the technique in a 9 year old girl with an anterior crossbite of permanent maxillary right central incisor (fig 14). One and a half months later, the crossbite was corrected and cement was removed. Fig 15 shows post treatment extra and intraoral photographs of the patient.

Case 6

An 8 year old boy was referred to a general dentist with anterior crossbite of permanent maxillary right central incisor with [illegible] over-retained deciduous [illegible] (fig 16). The deciduous tooth was extracted and cement was added on the occlusal surfaces of mandibular posterior teeth (deciduous second molar and permanent first molar) (fig 17). After two and a half months, the crossbite was corrected and the tooth came into its proper position in the dental arch (fig 18).

Discussion

The technique described here has proven its success at moving permanent teeth out of an anterior crossbite. Nevertheless, this method is recommended for dental anterior crossbites and not when there is a skeletal component involved. In the latter cases, orthopedic and more comprehensive treatment is more appropriate. However, in cases of dental anterior crossbites, this method is convenient for both the patient and the treating clinician. Children with special needs can also benefit from this approach as minimal cooperation is required.

Many questions arise regarding teeth coming out of crossbite with this particular technique. Is it because the occlusion is unlocked? Because the equilibrium between the lips and the tongue is disturbed? Does the altered [illegible] force the masticatory muscles into contraction?

According to [illegible] the equilibrium between the tongue and perioral muscles is responsible for the shape of the arches and tooth position. We hypothesize that the increased and unopposed force from the tongue brings the teeth that were in anterior crossbite into their normal position. The lips do not oppose these teeth because they are in a lingual relation to the other teeth, while the tongue, influenced by the occlusion due to the build ups, forces the teeth in position [illegible] "pliers". As we create an iatrogenic open bite, the tongue is forced to acquire the position it had in infantile swallowing-positioned forward to touch the lips and create a seal. This positional and thus the functional change forces the lingually positioned tooth/teeth in their normal labial position. However further studies are warranted.

Conclusion

This method is convenient for both the patient and the clinician, progress can be monitored easily, and no cooperation is needed. The tooth or teeth in crossbite are quickly and painlessly moved to their normal position. As we regard the technique, it is an appropriate method in treatment of dental or dentoalveolar anterior crossbites concerning primary or permanent teeth. As the movement takes place very quickly, there are no side effects regarding the gingiva, the occlusion or the TMJ. With early treatment, an anterior crossbite space can be gained for both the maxillary and mandibular arch, periodontal problems can be avoided, and normal skeletal growth is favoured.

Electromyographic studies could be beneficial in answering the factors why teeth move into their normal positions. We only hypothesized as to the factors involved. This method is a new approach to the technique adopted so far in orthodontics. Also it is a nice way to treat underserved patients in parts of the world where orthodontic treatment is generally expensive.

References

1. [illegible]
2. [illegible]