Correction of an anterior crossbite in mixed dentition: a case report

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ABSTRACT
Anterior crossbite is a situation in which one or more maxillary incisors occlude lingually to their antagonists. It constitutes major esthetic and functional concern during the stages of dental development. Single tooth anterior crossbite is a commonly encountered malocclusion during the development of occlusion in children.

The correction of anterior crossbite requires the creation of enough space, to bring the displaced tooth or teeth across the occlusion into proper position.

Early treatment in very young children prevents the establishment of malocclusion that can potentially worsen with age.

Different techniques have been used to correct anterior crossbite in mixed dentition. In this 8-year-old patient, a rapid maxillary expander with welded arm was used. This therapy combined with tonsillectomy followed by breathing exercises improved respiratory function.

It is therefore essential to intervene as early as possible to achieve the anatomical and physiological conditions for optimal growth.

Keywords: anterior crossbite, rapid maxillary expansion, early treatment.

INTRODUCTION
In the mixed dentition, dental and alveolar abnormalities include premature loss of primary or permanent teeth, anterior dental crowding, agenesis, retained primary teeth, supernumerary teeth, alveolar insufficiency, open bite, overbite and crossbite.

Graber ¹ defined crossbite as a condition where one or more teeth may be abnormally malposed either lingually or labially with reference to opposing teeth.¹

Anterior crossbite is a situation in which one or more maxillary incisors occlude lingually to their antagonists.²

Factors such as palatal eruption of the maxillary incisors, trauma to the primary incisors, supernumerary anterior teeth, retained primary teeth, odontomas, crowding in the incisor region, and inadequate arch length have been implicated in the aetiology of anterior crossbite.³⁵

In the early mixed dentition, anterior and posterior crossbites are believed to be transferred from the primary to the permanent dentition and can have long-term effects on the growth and development of the teeth and jaws.⁶

Anterior crossbite constitute a major esthetic and functional concern during the stages of dental development; when the purpose of an interceptive treatment is to normalize occlusion and create conditions for normal occlusal development.

Correction of anterior crossbite consists of labial tipping of upper incisors and lingual tipping of lower incisors.

Interception is a simple therapeutic procedure to achieve a partial or total correction before onset of full blown malocclusion. Its aim is to optimise anatomical and physiological conditions thus allowing normal growth to take place.

According to Salvadori⁷, interception makes it possible to prevent worsening of alveolar and skeletal disorders, thereby disrupting growth, function, aesthetics and sometimes the psyche of the child. This is achieved by correcting the malocclusion in the three dimensions of space, in order to restart the momentarily disturbed growth in its intensity or direction.⁷

However, elimination of the abnormalities is an essential pre-requisite for treatment in mixed dentition.⁸

Bassigny⁷ identified very early treatment in primary
dentition, early treatment in mixed dentition and late
treatment in adult dentition.
Early therapy will be short-lived and will involve
simple methods. The devices used may have
orthopedic or orthodontic action. The orthodontic
treatment will most often be done after a period of
suspension and supervision of varying duration.
This article documents a case in which an incisor cross
bite was corrected using a rapid maxillary expander.

Case report
An 8-year-old female patient presented with
anterior crossbite to the Department of Orthodontics
of Pellegrin Teaching Hospital (Bordeaux). Clinical
examination revealed the presence of mouth
breathing with poorly developed nasal orifices and
labial malocclusion at resting position with a lowered
lip. There were also a slight palatal tipping of teeth 65
and 26 and single anterior incisor crossbite 11/41

Figure 1: Pre-treatment extraoral views

Figure 2: Pre-treatment intraoral views

Panoramic radiograph showed normally developing permanent
successor tooth germs (Figure 3).

Figure 3: Panoramic radiograph

(Figures 1 and 2).
A voluminous tonsil appended to the palate was
present on lateral cephalometric radiograph (Figure 4).

Figure 3: Lateral cephalometric radiograph

The nasopharyngeal obstruction required a
tonsillectomy after ENT consultation followed by
breathing exercises.
The early treatment was aimed at correcting dental
and alveolar abnormalities and preventing future tooth
size-arch length discrepancy. A rapid maxillary
expander with welded arm (Figure 4) was cemented to
the maxillary teeth and activated by a quarter turn
twice a day for 7 days. The activation of the welded
arm made it possible to tip labially the maxillary
incisor. The correction of the incisor crossbite was
achieved after 14 days. The rapid maxillary expander
was then kept passive for one month.

Figure 4: Clinical views of the rapid maxillary
expander and lingual arch

After a 3-month clinical monitoring, extractions of
primary teeth (52, 62, 73, 83) were planned and a
lingual arch with loops was set up to limit mandibular
discrepancy.
Two years after treatment with maxillary expander,
clinical observation indicated nasal breathing. The lips
were competent at rest and a correction of initial
abnormalities have been obtained. However, the over
bite was exaggerated (Figures 5 and 6).
The lingual arch was planned to be maintained until the eruption of the lower premolars.

Discussion
The ideal age to treat anterior crossbite is between 8 years and 11 years, the period when the root is being formed and the tooth is in the active stage of eruption. The essential purpose interceptive orthodontics being arresting of bone or occlusal malformations in order to avoid complex treatment or to reduce treatment time. In growing subject, interception should be considered mandatory in anterior and lateral crossbite, due to the direct action of the aggravating mechanisms, which inevitably makes the aggravation itself inevitable. On the other hand, interception becomes optional in the event of an increase in overbite, an overjet and anterior open bite.

Different techniques have been used to correct anterior crossbite.
The tongue blade is the most basic technique, but it is rarely sufficient when more than one tooth is involved. The use of reversed stainless steel crowns presents some difficulties in adapting of a preformed crown to fit the tooth in crossbite and it is unaesthetic. A composite inclined plane is a simple and non-invasive effective technique but it cannot be used in cases where the anterior crossbite exceeds one third of the crown length. Removable orthodontic appliances are safe, easy and esthetically acceptable. Anterior crossbite involving one tooth, could have been corrected with a double helix apparatus. In our patient, because of mouth breathing, we have preferred the use of a rapid maxillary expander in order to obtain a slight enlargement of the floor of the nasal cavities, which will increase the nasal passage and facilitate nasal breathing. This transverse action induces, a reduction of the upper incisors malpositions and favors the spontaneous improvement of the respiratory functions. Anterior crossbite is one of the major responsibilities of pediatric dentist or orthodontist to guide the developing dentition to a state of normalcy in line with the stage of oro-facial growth and development.

References


