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## **Treatment of anterior cross bite: A review of literature and case report**

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### **Abstract**

Anterior crossbite is one of the most commonly seen orthodontic problems especially in growing children. The early interception in these cases can prevent many esthetic, functional and skeletal complications. However, proper identification of the type and severity of this problem is mandatory to achieve proper treatment outcomes. In this article, a comprehensive illustration of how to differentiate the different types of anterior crossbites in addition to a case report of early intervention in a patient with mixed dentition suffering from anterior crossbites.

**Keywords:** anterior cross bite, orthodontic problems, patient with mixed dentition suffering

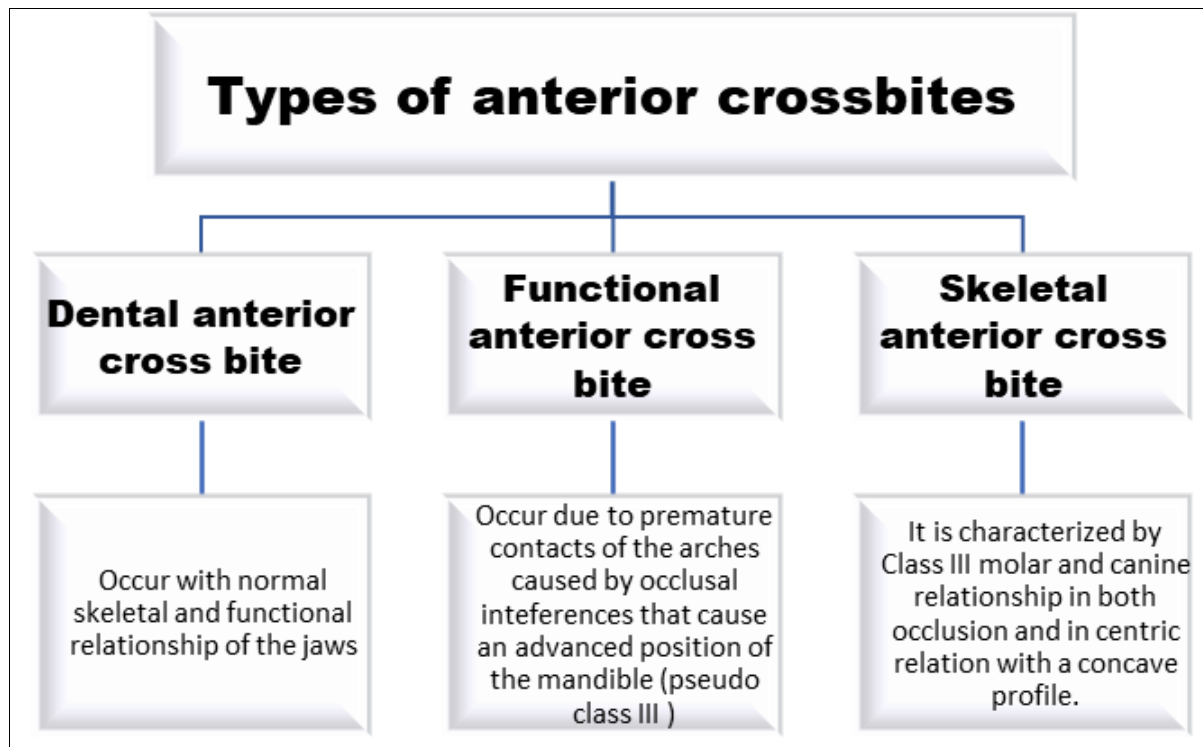
### **Introduction**

Anterior crossbite can be defined as an abnormal relationship that occur between one or more upper and lower anterior incisor teeth in which a reverse relation is established between them<sup>[1]</sup>. Clinically, it is manifested as a reversed overjet. The anterior cross bite is one of the orthodontic problems most commonly seen during the development of the patients<sup>[2, 3]</sup>.

### **Classification of anterior crossbites**

Anterior crossbite can be dental, functional and skeletal. Dental anterior crossbites occur due to palatally inclined developing tooth or teeth which cause ectopic eruption of this tooth or teeth. Dental crossbite is manifested as dental abnormality only with normal skeletal jaw relationships in addition to normal functional path of the mandible during opening and closing. On the other hand, functional anterior crossbite is associated with forward functional shift during mandibular closure which may result of what is called as pseudo class III condition which is most commonly seen in children. The mandible and mandibular incisors are guided forward in central occlusion, resulting in an anterior crossbite, can occur due to premature contacts of the arches and that will later lead to an advanced position of the jaw. This type of bite must be corrected as soon as possible because the delay in treatment of functional anterior crossbites can result in an orthopedic effect on the mandible leading to enhancement of its forward growth which will transfer the condition into skeletal problem. Skeletal anterior crossbite is a condition which is caused by mandibular protrusion and/or maxillary retrusion without any functional shifts during opening and closing of the mandible. It is characterized by Class III molar and canine relationship in both occlusion and in centric relation with a concave profile<sup>[4-6]</sup>.

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Classification of anterior crossbites

#### Sequela of untreated anterior crossbites

Anterior crossbite can lead to poor esthetics, gingival recession, periodontal diseases, attrition and damage to the teeth involved. It may also cause temporomandibular joint dysfunction due to restriction of normal mandibular movements. In addition, anterior crossbites may result in restriction of forward maxillary growth and/or enhancement of forward mandibular growth which may negatively affect the skeletal relation between the mandible and maxilla [7].

#### Benefits of early treatment of anterior crossbite

Early treatment of anterior crossbites is highly recommended to normalize the abnormal occlusion and produce a suitable condition that allow normal growth of the jaws. The benefits of early treatment can be seen in prevention of developmental abnormalities in the jaws cause by restriction and/or enhancement of unwanted growth patterns. It can also help in restoration of normal muscular balance before further deterioration of the condition. Facial appearance and lip posture can be significantly enhanced if early intervention was done during mixed dentition period. Furthermore, correction of lingual position of anterior teeth can provide a space for the erupting canines and prevent their impaction or ectopic eruption.

#### Treatment of anterior crossbite

If anterior crossbite occurs in primary teeth it is recommended to do selective grinding of the involved and opposing tooth to avoid the possible forward shift of the mandible. In mixed dentition, the condition can be managed with a removable plate consisting of an active element, protrusion screw or push spring, which push the upper incisors forward, and posterior bite plane to free the occlusion from the opposing arch [1, 8].

The duration of treatment for a single anterior cross bite is usually short which is about four to six months, with retention time up to 1 year or even without retention if adequate overbite is present. In dento-alveolar anterior crossbites a normal or increased overbite is an advantage, as a vertical

overlap of the upper incisors with the lower incisors post-treatment is vital for stability. A wooden spatula can be also utilized to correct a single tooth in anterior crossbite but it should not have a deep overbite. The patient is instructed to put the wooden spatula at an angle of 45 degrees resting behind the targeted tooth which is in crossbite and utilizing the lower incisors as support put some gentle pressure on the targeted tooth in a facial direction. In the stage of permanent dentition, it is recommended to used class III elastics combined with fixed appliance. However, if crowding exist extraction of lower first premolar may be planned as a camouflage treatment for the class III discrepancy. Finally, in patients with skeletal problems in mixed dentition in which there is a remaining growth that allow for growth modification, an orthopedic appliance may be suggested. Protraction facemask (reverse head-gear) can be utilized to correct anteroposterior maxillary deficiency and correction of anterior crossbite [9, 10].

#### Case report for a patient with anterior crossbite

An 8-year-old patient suffering from multiple carious lesion and lingual position of right and left upper lateral incisors was examined. The chief complain was having an unesthetic smile. Dental history revealed previous extractions of deciduous teeth. The medical history did not show any medical problem that could affect orthodontic treatment.

#### Clinical examination

Extra-oral examination revealed normal facial symmetry, normal vertical and transverse proportions (Figure 1). Intraorally, the patient showed class I molar relation, class I canine relation and class I incisor relation. The patient had initial caries in upper right first molar and upper left first molar which was restored by composite resin before the start of treatment (Figure 2). The patient was assessed for motivation and was found to be an internally motivated patient. This encouraged the used of removable appliance for treatment as it is more hygienic.



**Fig 1:** Extra-oral photograph of the patient.



**Fig 2:** Intra-oral photograph of the patient showing lingual position of upper lateral incisors.

### Radiographic examination

Lateral cephalometric radiograph revealed skeletal class I facial pattern with normal anteroposterior and vertical skeletal measurement. Panoramic radiograph did not show any abnormal pathology (Figure 3).



**Fig 3:** Lateral cephalometric radiograph and panoramic radiograph of the patient

### Treatment and treatment outcomes

After proper examination of the diagnostic records for this patient it was decided to treat the patient with removable appliance due to her internal motivation and willing to cooperate by wearing the removable appliance. An acrylic removable appliance was constructed. The appliance was composed of: two small active screws to push the lateral incisors forward, a labial arch to control the amount of labial movement of the upper laterals and to help in retention of the appliance, posterior bite plane to open the bite to allow forward movement of the incisors and finally two Adams' clasps on first molar to retain the appliance in place. The patient was instructed to activate the two screws with one quarter turn every 3 days and was evaluated regularly every 2 weeks. The treatment duration was 3.5 months in which total correction of the anterior crossbites was achieved. The patient was satisfied with the results and there was no need to use a retainer as there was adequate overbite in the lateral incisors which prevent any relapse to the former position.



**Fig 4:** The removable appliance used for treatment of anterior crossbite cases with active screw and posterior bite plane.

### Conclusion

Treatment of anterior crossbite can achieve excellent results if started in early mixed dentition stage. It is important before starting the treatment to understand the patient condition, abilities and needs. By insuring this, a high patient satisfaction with the results can be easily reached.

### Conflict of Interest

Not available

### Financial Support

Not available

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