

## Management of multiple anterior crossbite with Catlan's appliance during early mixed dentition

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### Abstract

**Introduction:** Anterior crossbite, particularly during the mixed dentition stage, is a frequently encountered malocclusion affecting approximately 4–5% of the pediatric population. When left untreated, it may lead to complications in function, esthetics, and jaw development. Early intervention is essential to guide proper occlusal relationships.

**Case History:** A 10-year-old patient presented with a chief complaint of reversed bite involving the upper front teeth, specifically teeth 11, 12, 21, and 22. The patient reported decreased self-confidence due to the appearance of the bite. A fixed Catlan's inclined bite plane appliance had already been placed on the lower anterior teeth, and the patient came in for follow-up and monitoring.

**Discussion:** Treatment of anterior crossbite can involve various removable or fixed appliances, with inclined bite planes offering the advantage of minimal dependence on patient compliance. Catlan's appliance, a lower inclined bite plane, facilitates proper overjet and overbite relationships through a simple yet effective mechanism. In this case, its use allowed correction of a four-incisor anterior crossbite efficiently, without damaging dental or periodontal structures.

**Conclusion:** Early correction of anterior crossbite using Catlan's appliance can be a reliable, non-invasive, and quick solution, particularly when patient cooperation is limited. This case highlights the importance of timely diagnosis and the choice of an appropriate fixed appliance in supporting esthetic and functional rehabilitation.

**Keywords:** Anterior Crossbite; Catlan's Appliance; Anterior Bite Plane; Human and Health

### 1. Introduction

Anterior crossbite is defined as an abnormal labiolingual relationship in which one or more maxillary anterior teeth are positioned lingually relative to the mandibular anterior teeth when the jaws are in centric occlusion (1). This condition commonly arises during the early mixed dentition period, with a prevalence ranging from 4% to 5% among children (2). However, the incidence may vary depending on population and diagnostic criteria used (3).

The etiology is multifactorial and includes abnormal eruption paths of permanent incisors, over-retained or prematurely lost deciduous teeth, trauma to primary incisors, crowding, odontomas, or parafunctional habits such as lip biting (1,4,5). If left untreated, anterior crossbite may lead to functional and structural complications such as enamel wear of the mandibular incisors, gingival recession, alveolar bone loss, midline shift, or temporomandibular joint

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dysfunction (5,6). Early intervention is vital to guide proper occlusal development and prevent long-term consequences (7). Among the treatment modalities available, Catlan's inclined bite plane is considered effective for dental-origin anterior crossbite, especially during the mixed dentition stage when growth is active (8).

This appliance works by utilizing an acrylic inclined plane cemented on the lower incisors to induce labial movement of the maxillary anterior teeth through natural occlusal force during mandibular closure (2,9). It offers simplicity, cost-effectiveness, minimal discomfort, and limited dependence on patient compliance compared to removable appliances (8,10). In this report, we present the correction of a four-incisor anterior crossbite in a 10-year-old patient using Catlan's appliance, emphasizing its interceptive value and psychological benefit during a crucial developmental stage (4).

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## 2. Case history

A 10-year-old patient presented with a primary complaint of reverse bite involving teeth 11, 12, 21, and 22. The patient reported a notable decline in self-confidence associated with the dental appearance. Clinical examination confirmed an anterior dental crossbite affecting all four maxillary incisors, with no skeletal discrepancy or functional shift noted. The molar relationship was Class I, and adequate space for labial tooth movement was present.



**Figure 1** #22-#21 crossbite

The patient had already been fitted with a fixed *Catlan's Inclined Bite Plane*, a lower anterior appliance fabricated from acrylic and positioned at a 45° angle to guide the maxillary incisors labially. The appliance was cemented to the mandibular anterior teeth using glass ionomer cement. The treatment protocol included biweekly follow-up visits over a period of one month. These visits aimed to monitor the progress of crossbite correction and to reinforce oral hygiene maintenance, as fixed appliances may compromise gingival health if not properly managed.



**Figure 2** Fixed *Catlan's Inclined Bite Plane*

Within four weeks of appliance placement, proper overjet and overbite were achieved, indicating successful correction of the crossbite. The inclined plane was removed promptly to avoid potential complications such as anterior open bite, which can result from prolonged use beyond 6 weeks. Post-removal evaluation showed stable incisal alignment with no signs of relapse, confirming the effectiveness of the Catlan's appliance in this case.



**Figure 3** One week follow up post *Catlan's Inclined Bite Plane* removal

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### 3. Discussion

Anterior crossbite in the anterior region is not only a functional concern but also significantly impacts the child's psychological and social well-being (5,11).

In this case, the presence of crossbite affecting four anterior maxillary teeth (11, 12, 21, and 22) led to a reported decline in self-confidence by the patient and concern over appearance (4).

Untreated anterior crossbite can result in adverse outcomes such as enamel attrition of lower incisors, gingival recession, compromised alveolar bone support, and midline deviation (1,6).

Early treatment during the mixed dentition stage offers an optimal window to intercept these problems before skeletal patterns are established (3,7).

Catlan's appliance is a fixed inclined bite plane made from acrylic and typically fabricated at a 45° angle to the long axis of the lower anterior teeth (2,9).

It is designed to guide maxillary incisors labially through mandibular functional movement and is indicated in cases of dental, rather than skeletal, crossbite origin (8).

In this case, the molar relationship was Class I, no skeletal discrepancies were present, and sufficient space was available for labial movement of the upper incisors—making the patient a good candidate for Catlan's appliance (4,9).

One of the primary advantages of this appliance is its independence from patient cooperation, unlike removable appliances such as Hawley retainers or finger spring plates (5,10).

Studies have reported successful correction of anterior dental crossbite within two to four weeks using Catlan's appliance, depending on the severity and number of teeth involved (2,4,8).

In the current case, the appliance was in place for four weeks with biweekly follow-up visits, during which oral hygiene was closely monitored (4).

Regular follow-ups are critical to assess progress, manage gingival health, and prevent potential complications such as decalcification or open bite due to prolonged use (9).

Importantly, this case also underscores the psychological effect of anterior crossbite correction.

The child's concern regarding esthetics and the associated loss of self-confidence was addressed not only through clinical correction but also through improved psychosocial interaction post-treatment (11).

Children with untreated anterior malocclusion are more prone to bullying, social withdrawal, and reduced quality of life (11,12).

Thus, early interception with a simple fixed appliance such as Catlan's can contribute significantly to both functional rehabilitation and emotional development.

Although effective, Catlan's appliance must be used judiciously, with timely removal—typically within 3–4 weeks—to avoid inducing anterior open bite or hindering posterior occlusion (2,6).

In this case, appliance removal was performed promptly after correction, followed by enamel polishing and fluoride application to maintain tooth integrity (4,9).

Overall, the case supports the literature that emphasizes the value of early, conservative, and low-dependency interventions in managing anterior crossbite during growth (7,8,10).

It also highlights the pediatric dentist's critical role in screening, diagnosis, and interceptive care that not only corrects malocclusion but also prevents future orthodontic complexity (3,10).

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#### 4. Conclusion

This case highlights the efficiency and practicality of using Catlan's inclined bite plane for anterior crossbite correction in children. With appropriate appliance design, regular follow-up, and strict oral hygiene measures, early intervention using this fixed technique can restore function, improve esthetics, and positively impact the child's self-esteem.

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#### Compliance with ethical standards

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##### *Disclosure of conflict of interest*

The authors declare that there is no conflict of interest regarding the publication of this document.

##### *Statement of informed consent*

Informed consent was obtained from patient included in the study.

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