

Use of Catlan's Appliance to Correct Anterior Crossbite: Two Cases

Ceren YILDIRIM¹, Özlem Marti AKGÜN^{1*}, Feridun BASAK²

¹Dr, DDS, PhD, Gulhane Medical Academy, Department of Pediatric Dentistry, Ankara, TURKEY

²Professor, MD, Gulhane Medical Academy, Department of Pediatric Dentistry, Ankara, TURKEY

*Corresponding Author:

Name: Ozlem Marti Akgun

Email: ozlemmartiakgun@gmail.com

Abstract: Anterior crossbite may cause esthetic and functional problems during childhood development. One of the most important duties of the pediatric dentist and orthodontist is to ensure normal development of dentition during orofacial maturation. When malocclusion is detected at later stages, treatment becomes more complicated. This case series presents two cases of anterior crossbite corrected within three weeks by using Catlan's appliance.

Keywords: Appliance, Crossbite, Malocclusion.

INTRODUCTION

Anterior crossbite is an abnormal labiolingual relationship between one or more maxillary and mandibular incisors [1]. Anterior crossbite may lead to significant esthetic and functional problems during childhood development. The incidence of anterior crossbite varies between 4–5%, and it is often diagnosed during the early mixed dentition period [2, 3]. Etiologic factors for this condition are as follows: maxillary anterior incisor eruption directed lingually; a repaired cleft lip that is traumatized by the primary incisors; supernumerary teeth; necrotic or pulpless retained primary teeth; odontomas; crowded anterior teeth; insufficient arc length; and biting trauma inside the maxillary lip [4]. Anterior crossbite may cause abrasion to the mandibular incisor enamel, bone atrophy, or gingival disease. Therefore, anterior crossbite should be treated early and immediately before tooth, periodontal, and TMJ pathologies develop [3, 5-7].

Anterior crossbite is corrected using a variety of techniques such as tongue blocks, reverse stainless steel crowns, fixed acrylic inclined plane, removable acrylic appliances with finger springs, the expansion appliance, tongue blade therapy, and the Bruckl appliance [8]. Catlan's appliance is recommended for use during the early mixed dentition period. The dentist should initially determine whether the crossbite is skeletal or dental in origin before using this particular appliance [3]. The treatment primarily aims to create a correct relationship between the affected maxillary teeth. Once a normal overbite and overjet are established, relapse is uncommon [9]. The present two-case series describes treatment of anterior crossbite using Catlan's appliance.

CASE REPORT 1

An 8-year-old male patient was admitted to the Pediatric Dentistry Department due to poor esthetics. The intraoral examination showed that the maxillary permanent central incisors and left lateral incisor had erupted normally, but the right lateral incisor was misdirected lingually. A Class I molar and canine relationship in the early mixed dentition was observed. There was adequate mesiodistal and labial directed movement of the maxillary teeth (Fig. 1). The parents were informed about the treatment and provided written consent to proceed. Alginate impressions of both jaws were obtained, and an acrylic inclined plane angled 45 degrees was prepared to cover the tooth long axis. The inclined plane was cemented to the mandibular incisors and canine teeth using glass ionomer cement, and the contact point was corrected only at the incisal edge of the cross bite (Fig. 2). The patient was instructed to maintain oral hygiene and returned weekly for re-examination. The crossbite was repaired using Catlan's appliance within three weeks (Fig. 3). After removing the appliance, the enamel was polished, and topical fluoride was applied. The patient was re-examined six months later, and no relapse of the crossbite was observed in the maxillary right lateral incisor.



Fig. 1: Intraoral appearance of Case 1 before treatment



Fig. 2: Application of Catlan's appliance



Fig. 3: Three weeks after application of Catlan's appliance



Fig. 4: Intraoral appearance of Catlan's appliance



Fig. 6: Intraoral appearance of Case 2 three weeks after application

CASE REPORT 2

A 12-year-old male patient was referred to the Pediatric Dentistry Department with a chief complaint of poor esthetics in the front teeth. On clinical examination, an anterior crossbite at the maxillary left central incisors and a Class I molar relationships were diagnosed (Fig. 4). The parents were informed of the treatment, and a Catlan's appliance was prepared as described in Case 1 (Fig. 5). The patient was instructed to maintain oral hygiene and return weekly for re-examination. The crossbite was repaired using Catlan's appliance in three weeks (Figure 6). The appliance was removed, the enamel polished, and topical fluoride was applied. A repeat examination six months later showed a normal incisal position with no relapse.



Fig. 4: Intraoral appearance of Case 2 before treatment

DISCUSSION

Anterior cross bite is characterized by a lingual position of the maxillary anterior teeth relative to the mandibular anterior teeth [1]. Anterior crossbite does not spontaneously correct because the maxillary teeth are locked into malposition by the mandibular teeth. This condition can occur in a single tooth or all four incisors. If untreated, serious malocclusion will result. Early treatment can prevent skeletal and dentoalveolar developmental disorders [3].

Before treating anterior crossbite, the possibility of mandibular incisor crowding, TMJ disease, and maxillary deficiency should be evaluated. The best time to treat anterior crossbite is between 8–11 years of age, and patient motivation is critical for success. In addition, adequate space for tooth realignment, sufficient overbite to maintain the correct position long-term, and a Class I relationship are important in case selection [5].

The biting lower jaw inclined plane is a classic method that is used to treat a crossbite involving one or several teeth, provided there is adequate space to enable labial movement of the maxillary teeth. The affected teeth are moved labially due to the interaction between the inclined plane and musculature [10].

Depending on the number of affected teeth, available space, dentition stage, and etiology, different approaches may be applied in treating crossbite. Patient cooperation is obligatory for successful treatment using tongue blocks. However, it is impossible to predict the precise direction and magnitude of force generated by tongue blocks. Reverse stainless steel crowns can also be successful, but there are several disadvantages such as poor esthetic outcome, the preparation of the inclined plane beforehand, poor patient compliance, and the required parental involvement [11].

Catlan's appliance, a low jaw inclined plane, is based on Newton's 3rd law of motion. This appliance generates a slight lingual movement in the mandibular teeth, while generating labial movement in the maxillary teeth. This method is reliable, economical, fast, and easy; it could serve as an alternative to other methods. The treatment outcome does not rely on patient compliance because the appliance is cemented onto the incisors. Furthermore, the appliance does not interfere with growth and development, and it is comfortable for the patient. For these reasons, we chose the Catlan's appliance in two cases. However, difficulty speaking and chewing, as well as the risks of developing an anterior open bite if applied for more than six weeks, are among the disadvantages. Therefore, if treatment is prolonged, then the patient should be re-examined weekly [3].

CONCLUSION

In these two cases, a Catlan's appliance was used instead of a fixed orthodontic treatment. The anterior crossbite was corrected in three weeks without harming the teeth or periodontal tissue. During early developmental stages, the utility of the treatment should be considered, and malocclusion should be evaluated based on the facial profile. Comparison is needed between conventional and alternative methods for correcting anterior crossbite.

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