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(CASE REPORT)

Inclined bite plane for managing anterior crossbite: A case report

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Abstract

Introduction: Anterior crossbite, occurring in approximately 4-5% of the population, poses challenges primarily during mixed dentition. Early correction of anterior crossbite is critical for preventing malocclusion.

Case History: A 6-year-old male with complaint of the left upper incisor was behind the lower incisor and affecting the boy's confidence. The patient was cooperative (Frankl scale number 4).

Discussion: Treatment options include various appliances such as tongue blades, Hawley retainers, and inclined bite planes, each with advantages and disadvantages. The inclined bite planes appliance, chosen in this case, aims to achieve a stable relationship between overjet and overbite, promoting proper tooth alignment.

Conclusion: Successful treatment prioritizes patient comfort, tissue safety, swift correction, and natural growth support. This emphasizes the importance of selecting the most suitable appliance, such as the Catlan's, for effective correction.

Keywords: Anterior crossbite; Inclined Bite Plane; Human; Health

1. Introduction

Anterior crossbite refers to a situation where one or more of the upper front teeth are positioned too far back (linguoversion), causing them to get stuck behind the lower front teeth when the mouth is fully closed(1).Anterior dental crossbite occurs in around 4-5% of the population, mainly in the mixed dentition phase(2). Another study conducted by Mai et al. in Zhuang Province in China revealed that the prevalence of anterior crossbite tendencies was 15.1%(3).

The etiology of anterior crossbite is typically caused by the misalignment of the upper front teeth due to a lingual eruption path.Other potential causes include trauma to the deciduous teeth in the upper jaw, leading to the permanent teeth being pushed inward, crowding in the front teeth area, supernumerary teeth, a habit of biting the upper lip, delayed loss of deciduous teeth, over-retaineddeciduous teeth or their roots, and the presence of odontomas(3,4). Anterior crossbite requires immediate treatment to prevent the development of malocclusion(2).

Various appliances can be used to treat anterior crossbites, such as Hawley's appliance with Z spring, tongue blade, and Catlan's appliance. Catlan's appliance is the lower inclined bite plane(2,4). In this case report, we used an inclined bite plane to correct an anterior crossbite.

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2. Description of case

A 6-year-old male patient accompanied by her mother came to the Hajj Regional General Hospital. The chief complaint upon arrival was that the left upper incisor was behind the lower incisor. There was a history of persistent tooth #61, which had been extracted before. Upon extraoral examination, no abnormalities were found. Intra-oral examination showed crossbite of tooth #21 and class I molar relationship. There was no parafunctional habit observed in the patient, and based on analysis, there was sufficient mesiodistal width for tooth movement labially.

After discussing the advantages and disadvantages of each treatment plan, we decided to use an inclined bite plane to correct the crossbite. The inclined bite plane was designed with 45 degrees sloped to the long axis of the tooth and created using acrylic. The appliance was cemented to the anterior lower incisors using type I glass ionomer cement. The patient was then instructed to maintain oral hygiene and to come every week for observation. The parents and the patient were informed of the inconvenience during the appliance usage and advised to adjust to a new bite and soft diet for the first few days. The appliance was worn for three weeks until the crossbite was corrected.

Figure 1 (a) intraoral view showing crossbite of tooth #21(b)post inclined bite plane insertion; (c)after inclined bite plane removal; (d)2 months follow up.

3. Discussion

Malocclusion, especially on the anterior region, can have a negative impact on someone's aesthetic and emotional well-being (5,6). Early anterior crossbite correction plays a crucial part in preventing further malocclusion in children. Anterior crossbite correction can be achieved using removable or fixed appliances such as an inclined bite plane (Catlan's appliance), tongue blade, Hawley retainer with Z spring, reverse crown, etc. (7). Each of these appliances comes with its advantages and disadvantages.

Before choosing the appliance, consideration was made based on the skeletal and dental relationship and patient compliance. An inclined bite plane was selected to correct the malocclusion because the patient has anterior dental crossbite without involving the skeletal bone. The Catlan's appliance aims to guide the maxillary incisors affected towards achieving a stable relationship between overjet and overbite(8).

This appliance is employed for lower front teeth, utilizing muscle forces to direct erupting teeth into their proper positions. When worn, the appliance allows teeth to touch only in the front during chewing, effectively correcting the crossbite. It's crafted with acrylic at a 45° angle on the lower incisors(9).The Catlan's appliance prompts a gentle inward shift of the lower teeth and an outward shift of the upper teeth. The optimal time for correcting anterior crossbite is during the mixed dentition phase. This developmental stage, characterized by root formation and active tooth eruption, presents the prime opportunity for managing occlusion and intercepting malocclusion(2).

The treatment chosen should prioritize the child's comfort, avoid harm to surrounding tissues, provide quick correction of the crossbite, and support natural growth and development(2). This is why Catlan's appliance was administered to the patient in the aforementioned case, as it demands minimal patient cooperation and is cost-effective, swift, and simple to create.

The correction period lasted three weeks for this case. Once the desired adjustment was achieved (with the upper incisors positioned in front of the lower incisors, creating an overbite), the appliance was removed to prevent the occurrence of an open bite. Mustapha et al. said the successful correction of an anterior crossbite is determined by achieving a favorable overjet and overbite, ensuring that the incisors are positioned in their normal relationship with each other(10).

4. Conclusion

The inclined bite plane is an acceptable appliance for correcting single-tooth anterior crossbite.

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 patients included in the study.

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