

Case Report: Rapid Early Correction of Pseudo-Class III Malocclusion

Ilvana Ardiwirastuti ^{1,*}, Yesica Dea Cahyani ² and Dion Sandro Satrya ³

¹ Department of Pediatric Dentistry, Faculty of Dental Medicine, Institut Ilmu Kesehatan Bhakti Wiyata, Kediri, East Java, Indonesia.

² Department of Oral Biology, Faculty of Dental Medicine, Institut Ilmu Kesehatan Bhakti Wiyata, Kediri, East Java, Indonesia.

³ Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Institut Ilmu Kesehatan Bhakti Wiyata, Kediri, East Java, Indonesia.

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Abstract

Background: Class III malocclusion is a type of malocclusion that requires early treatment. Pseudo Class III is a type of Class III malocclusion. One of the characteristics of pseudo Class III is a potential anterior crossbite due to edge-to-edge occlusion. Pseudo Class III can be managed in a short time and prevent the progression of Class III malocclusion.

Case Presentation: A 7-year-old male patient complained of feeling embarrassed because his lower teeth were positioned in front of his upper teeth. His parents wanted immediate treatment for their child's condition. On intraoral examination, the first molar relation of the right permanent tooth was Class I, and the left was end-to-end, anterior and posterior crossbite, and an edentulous ridge post-extraction of 53, 54, 55, 64, 65, 74, 75, 84, and 85. This case has been diagnosed as pseudo-Class III malocclusion. Catlan's Appliance was chosen to correct anterior crossbite. The anterior crossbite have been corrected in seven days.

Conclusion: Treatment planning for correcting pseudo-class III malocclusion correction should be done in early mixed dentition. The Catlan appliance is a removable appliance that can be used to quickly correct pseudo-Class III cases.

Keywords: Pseudo Class III Malocclusion; Anterior Crossbite; Catlan's Appliance

1. Introduction

Southeast Asian populations have the highest malocclusion class III prevalence rate (15.8%)[1]. The orthodontic anomalies such as malocclusion class III can be caused by genetics, congenital factors, bad habits, or environmental factor[2]. Class III malocclusion was perhaps the most challenging to treat. A prolonged Class III malocclusion may influence mental health, facial appearance, and dental function. Early orthodontic treatment is needed for minimal potential abnormal growth potential of maxillofacial development or to reduce the severity of skeletal malformation. This approach helps to minimize the difficulties and shortens the treatment cycle of later-stage treatment [3].

Early treatment of the anterior crossbite due to a functional shift (pseudo-Class III) may be successful and have a favorable prognosis. One of the characteristics of pseudo class III is a potential anterior crossbite due to edge-to-edge occlusion[4]. Dental correction of malocclusion class III in the mixed dentition stage may be corrected by a fixed or a removable appliance such as a removable appliance incorporating a Z-spring and posterior bite plate, a lower inclined bite plane (Catlan's appliance), a Fränkel III appliance, reverse pull headgear, etc [1].

* Corresponding author: Ilvana Ardiwirastuti.

The success of early treatment for Class III depends on many factors such as age, sex, compliance level, severity of malocclusion, and timing of the intervention. The selection appliance for the correction of class III malocclusion, which is caused by multifactorial factors (environmental and genetic), should be considered for the diagnosis of skeletal discrepancy for jaw growth modification and understanding the dentition phase (early/late mixed dentition) [5].

2. Case presentation

A 7-year-old male patient complained of feeling embarrassed because his lower teeth were positioned in front of his upper teeth. His parents wanted immediate treatment for their child's condition. Furthermore, anamnesis showed no genetic susceptibility to anterior crossbite in the patient's condition. The patient experienced early childhood caries after completing holistic treatment. He has no systemic disease; there is no history of diabetes mellitus, hypertension, asthma, allergies, or any bad habits.

The patient's extraoral examination showed a concave facial profile, hypertonic lips, a normal nasolabial angle, no TMJ abnormalities, and a maxillary dental midline that was unaligned with the facial midline. On intraoral examination, moderate oral hygiene was found; the first molar relation of the right permanent tooth was Class I, and the left was end-to-end, anterior and posterior crossbite, and an edentulous ridge post-extraction of 53, 54, 55, 64, 65, 74, 75, 84, and 85. Post-root canal treatment 83, 73, and 63; root retained of 52 and 62; healthy gingiva, normal labial frenulum, deep palate, constriction of the maxillary jaw, and the patient was in the period of mixed teeth [FIGURE1]. The study model analysis revealed an overbite of -4 mm and an overjet of -2 mm. A panoramic radiographic examination showed complete tooth buds [FIGURE 2]. The patient could be positioned with the anterior teeth in an edge-to-edge position (pseudo-Class III).



Figure 1 Intraoral Examination showed first molar relation of the right permanent tooth was Class I, and the left was end-to-end, anterior and posterior crossbite

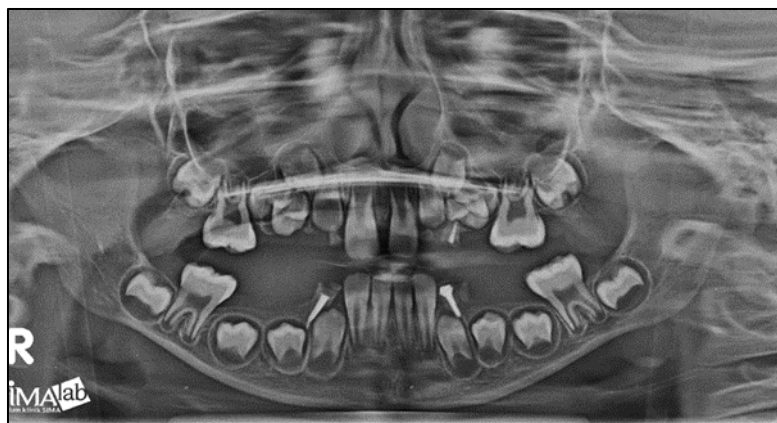


Figure 2 Radiograph Examination

The patient's diagnosis was pseudo-Class III malocclusion. Treatment objectives were to eliminate potential oral infection caused by caries. The anterior crossbite was first corrected by inclining the bite plane (Catlan's Appliance).

The second phase involved stimulating maxillary jaw growth and maintaining the mandibular jaw space with a removable appliance. At the initial visit, the patient had an impression and was informed about the risks associated with using an incline appliance, including the possibility of gingival inflammation, difficulties eating, and the necessity for adaptation. The patient signed an informed consent form after understanding. During the second appointment, zinc phosphate was used to insert the appliance [FIGURE 3].



Figure 3 Catlan's Appliance cemented by Zinc Fosfat

Control H+7 post-insertion showed the incline appliance in a retentive and stable position, the cervical gingiva appeared reddish, and there was no tooth mobility. The appliance was removed to track the effectiveness of the treatment. the results showed that The anterior crossbite had been corrected. The patient then went through a second phase of appliance creation to maintain the anterior crossbite correction [FIGURE 4]



Figure 4 H+7 Control post Treatment

3. Discussion

Class III malocclusion is characterized by an underdeveloped maxilla or prognathic jaw, which typically has a concave profile. Characteristic molar relation according to angle: the lower first molar is mesially positioned in relation to the upper first molar, followed by an anterior crossbite [6]. The ability to retract the jaw to the edge-to-edge position of the anterior teeth during the resting position is a characteristic of functional Class III [1]. Functional or pseudo-class III can be caused by a difference between maximal intercuspation and centric occlusion. an occlusal disturbance when the patient closes their jaw for maximal intercuspation while moving their mandible forward[7]. There are three treatment options for class III malocclusion: growth management, camouflage treatment, and orthognathic surgery [8].

The interceptive orthodontic golden period may start in the early phase of the mixed tooth period, which is 7-8 years of age. Early treatment will prevent/minimize developing further malocclusion and promote direct correct growth to minimize the potential for surgical orthodontic management in adulthood [8]. A patient 7 years old, the patient in this case was in the early mixed dentition phase. The molar relationship showed class 1 and cusp-to-cusp, which is one of the characteristics of a class III pseudo-malocclusion. The patient was quite cooperative, so it was decided to correct the malocclusion as soon as possible.

Common orthodontic appliances used for Class III malocclusion include simple removable appliances, functional appliances, reverse-pull headgear, fixed appliances, and clear aligners. A lower inclined bite plane (Catlan's appliance) is one of the removable appliances to correct class III malocclusion[1], [9]. Indications for Catlan's appliance are for anterior crossbite cases with deep overbite, small overjet, and insufficient posterior tooth eruption in primary dentition. Catlan's appliance can't be used for shallow overbite or large overjet conditions. Course of treatment of Catlan's

appliance is around 1–3 months [1]. The Catlan's appliance was decided on in this particular case due to the anterior crossbite and deep bite, with an overjet value of -2mm. Seven days following insertion, the child's oral health and post-insertion gingivitis were evaluated during a follow-up appointment. The appliance was removed for an examination of the above conditions. The anterior crossbite had been fixed within a week of insertion, according to the results.

The Catlan appliance is an option for short-term correction of Class III malocclusion in the early mixed dentition phase. Acrylic material is used to create this inclined plane with a 45° slope to the teeth's long axis [1]. Dental cement (zinc oxide eugenol cement) is used to cement the acrylic inclined plane to the mandibular canines and incisors. Principal mechanism: The Catlan appliance likes the anterior bite plane (ABP). Anterior bite planes (APBs) have risks for cases of joint pain and may complicate TMD symptoms and the eruption of posterior teeth or intrusion of anterior teeth if used for >2 months without appropriate supervision [10]. It is not advisable to use this appliance for more time than is advised. In this case, the anterior crossbite was corrected after just one week of use. The TMJ may experience structural and morphological alterations as a result of an excessive mechanical load on the occlusal teeth. When the posterior teeth can still be occluded, ABP's band materials are fixed to the anterior, causing intermittent posterior condyle displacement. This causes TMJ morphological changes, resulting in functional malocclusion, leading to the mandible moving posteriorly in the occluded position. Numerous studies show that muscle tension causes region-specific mandibular changes, such as angulation of the Co-gonion (Go) to Gn-Me and linear changes of the condyle (Co) point to the gnathion (Gn)-menton (Me) point [10].

4. Conclusion

Class III malocclusion correction should be corrected as early as possible. The best period to potentially manage a Class III or pseudo-Class III malocclusion is in the early mixed dentition. The Catlan appliance is a removable appliance that can be used to quickly correct pseudo-Class III cases. The use of an anterior bite plane during the growth and development phase of early mixed dentition can lead to the movement of the TMJ joint, causing the mandible to move backward, correcting Class III malocclusion.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest statement to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study."

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