Case Report

Anterior Crossbite Correction in Early Mixed Dentition Period Using Catlan's Appliance: A Case Report

Sunil Pandey[1], Anjali Singh[2], Anil Pandey[3], Bhanvi Jagatramka[4], Namrata Ingavale[5], Ashish Patel[6]

[1]*Associate Professor, Department of Pediatric and Preventive Dentistry, Government Dental College, Raipur (C.G.), India*
[2]*Associate Professor, Department of Pediatric and Preventive Dentistry, Government Dental College, Raipur (C.G.), India*
[3]*Lecturer, Department of Pediatric and Preventive Dentistry, Government Dental College, Raipur (C.G.), India*
[4]*PG Student (Second Year), Department of Pediatric and Preventive Dentistry, Government Dental College, Raipur (C.G.), India*
[5]*PG Student (Second Year), Department of Pediatric and Preventive Dentistry, Government Dental College, Raipur (C.G.), India*
[6]*PG Student (Second Year), Department of Pediatric and Preventive Dentistry, Government Dental College, Raipur (C.G.), India*

ABSTRACT

Anterior crossbite poses a major esthetic and functional concern for parents during a child's developmental phase. Anterior crossbite rarely self-corrects, as the maxillary incisors are locked behind the mandibular incisors, leading to progressive malocclusion. Early intervention can help restore muscle balance and support proper occlusal development. Timely treatment can also prevent dysplastic growth of both skeletal and dentoalveolar components.[18] The Lower Inclined Bite Plane has been traditionally used to correct single or multiple anterior dental crossbites, provided sufficient space exists in the dental arch for labial movement of the upper incisors. This appliance works by utilizing the force generated by closing muscles and the inclined plane.

Key-Words: Anterior Crossbite, Mixed Dentition, Catlan's Appliance, Malocclusions, Orofacial Growth

INTRODUCTION

Anterior crossbite presents a significant esthetic and functional concern for parents during a child's developmental phase. It is the responsibility of pediatric dentists or orthodontists to guide the developing dentition toward normalcy, aligning with the child's stage of orofacial growth and development.[1] The mixed dentition period provides an optimal window for occlusal guidance and interception of malocclusions.[2] Delayed treatment can lead to more complex procedures later.[3] Despite this, there are limited case reports on the use of Catlan's appliance for the treatment of anterior crossbite. This paper presents two cases where anterior dental crossbite was successfully corrected using a simple fixed Catlan's appliance. Graber defines crossbite as the abnormal positioning of one or more teeth, either lingually or labially, relative to their opposing teeth.[4] Anterior crossbite refers to the lingual displacement of maxillary anterior teeth relative to mandibular anterior teeth.[5] It can also be defined as the lingual positioning of upper primary or permanent anterior teeth in relation to the lower incisors. Severe cases of anterior crossbite, unlike posterior crossbite, are typically left uncorrected until later stages of treatment or require surgical intervention. The early mixed dentition period offers an ideal opportunity to correct the bite using Catlan's appliance. To apply this appliance, it is important for the clinician to distinguish between crossbites of dental origin and those of skeletal origin.[4,7-9] Dental crossbite involves localized tipping of the teeth and does not affect the basal bone.[10] In simple anterior dental crossbite cases, the patient typically exhibits a normal skeletal pattern, with the problem limited to the axial inclination of the affected teeth.[8] As per Profitt, correcting anterior dental crossbite first requires creating sufficient space, followed by bringing the displaced teeth into proper occlusion.[11] Anterior dental crossbite is reported in approximately 4-5% of cases, usually becoming evident during the early mixed dentition phase.[12,13] Several factors contribute to the development of anterior crossbite, such as lingual eruption paths of the maxillary anterior incisors, repaired cleft lip, trauma to primary incisors, supernumerary anterior teeth, retained deciduous teeth, odontomas, incisor crowding, inadequate arch length, and upper lip biting habits.[9,10,12–15] If left untreated, anterior crossbite can result in abnormal enamel wear on the lower incisors, dental compensation of mandibular incisors, thinning of the labial alveolar plate, and gingival recession.[4,7–9]

Prompt treatment of anterior dental crossbite is crucial to prevent mobility, fracture of the anterior teeth, periodontal problems, and temporomandibular joint issues.[7,9,15,16] The primary treatment goal is to tip the

Access This Article Online

ipdcjournal@gmail.com

Month of Submission : 06-2024
Month of Peer Review : 09-2024
Month of Acceptance : 10-2024
Month of Publishing : 11-2024

Corresponding Author: *Dr. Sunil Pandey, E-mail: drsunilpandeymds@gmail.com*

affected maxillary teeth labially until a stable overbite relationship is achieved.[16] Relapse is usually prevented by the normal overjet/overbite relationship that is established.[17] Various treatment options for correcting anterior crossbite include tongue blades, reversed stainless steel crowns, fixed acrylic inclined planes, bonded resin-composite slopes, removable acrylic appliances with finger springs, and the Bruckl appliance.[9,10,14] A 9-year-old female patient, accompanied by her parents, presented to the Department of Pediatric and Preventive Dentistry at the Government Dental Hospital, Raipur, with a complaint of a backwardly positioned upper left central incisor. A comprehensive clinical examination revealed the permanent maxillary left central incisor in crossbite. Based on clinical and radiographic assessments, the decision was made to fabricate an inclined plane. After informing the parents of the malocclusion, written consent was obtained. The crossbite was corrected within three weeks following the cementation of the Catlan's appliance. A 6-month recall showed a stable incisal relationship with no relapse. In this case, the patient was in the early mixed dentition stage, with class I molar and canine relationships. Sufficient mesiodistal width was present to allow labial movement of the maxillary tooth. Alginate impressions of both arches were taken, and an acrylic inclined plane was fabricated with a slope at a 45-degree angle to the tooth's long axis. The inclined plane was cemented onto the mandibular incisors and canines using zinc oxide eugenol cement. After the appliance was placed, the only contact point in occlusion was at the incisor region.

Fig 1: Intra oral view

Fig 2: Intra oral view of appliance

The patient was advised to maintain good oral hygiene, and weekly follow-ups were scheduled to monitor progress. Parents were informed that the child's bite might feel different initially, and a softer diet was recommended for the first few days after appliance cementation. Once the correction was achieved, the Catlan's appliance was removed, the enamel surface polished, and topical fluoride (APF gel) applied. The appliance remained in place throughout the follow-up period without requiring recementation.

DISCUSSION

Anterior crossbite rarely self-corrects, as the maxillary incisors are locked behind the mandibular incisors, leading to progressive malocclusion. Early intervention can help restore muscle balance and support proper occlusal development. Timely treatment can also prevent dysplastic growth of both skeletal and dentoalveolar components.[18] The Lower Inclined Bite Plane has been traditionally used to correct single or multiple anterior dental crossbites, provided sufficient space exists in the dental arch for labial movement of the upper incisors. This appliance works by utilizing the force generated by closing muscles and the inclined plane. However, one limitation of early treatment is the potential for two-phase orthodontic therapy, as predicting mandibular growth can be challenging.[19] The success of treatment with this appliance depends on case selection, which, according to Lee (1978), involves three key factors: adequate space in the arch to reposition the tooth, sufficient overbite to hold the tooth in position post-correction, and a class I molar relationship[7] Factors such as crowding in the mandibular incisors, temporomandibular joint issues, and maxillary deficiency should be considered before selecting this treatment approach. The ideal age for correcting anterior dental crossbite is between 8 and 11 years, during which the tooth is still erupting and its root is forming. The child's age and motivation for treatment are crucial in determining the success of the intervention. Various treatment modalities for anterior dental crossbite correction in the early mixed dentition phase include tongue blade therapy[20], reverse stainless steel crowns[21], removable Hawley retainers with anterior Z-springs[16], and bonded resin-composite slopes[10]. Tongue blade therapy requires patient cooperation and lacks precise control over the direction and amount of force applied. While reverse stainless steel crowns have been successful, they come with drawbacks, such as an unaesthetic appearance and limitations due to their pre-formed inclined slopes. Removable appliances also require cooperation from both the patient and parents for successful outcomes.[22] The Catlan's appliance (Lower Inclined Bite Plane) operates on Newton's third law of motion. The resin slope functions to tip the maxillary tooth labially while slightly tipping the mandibular tooth lingually.[21] This method is a safe, cost-effective, quick, and simple alternative for crossbite treatment. Its cost-effectiveness lies in its avoidance of fixed orthodontic procedures, and because it is cemented, it does not rely on patient compliance, does not interfere with growth, causes minimal discomfort, and requires few

dental visits.[22] However, the appliance can hinder speech, complicate chewing, and may result in anterior open bite if left cemented for more than six weeks.[4] Therefore, weekly follow-ups are essential to determine the appropriate timing for appliance removal and to avoid extended treatment durations.

CONCLUSION

The cases presented demonstrate that Catlan's appliance is a viable and effective alternative for correcting anterior dental crossbite without the need for complex fixed orthodontic procedures. In this particular case, the crossbite was corrected within three weeks, with no adverse effects on the teeth or surrounding periodontal tissues. Emphasis should be placed on proper diagnosis and assessment of the malocclusion, taking into account the child's facial profile and the potential benefits of early treatment at this developmental stage. Further research is needed to compare this traditional method with other treatment approaches for anterior dental crossbite correction.

REFERENCES

1. Al-Sehaibany F, White G. A three-dimensional clinical approach for anterior crossbite treatment in early mixed dentition using an Ultrablock appliance: case report. J Clin Pediatr Dent. 1998;23(1):1-8.
2. Kocadereli I. Early treatment of posterior and anterior crossbite in a child with bilaterally constricted maxilla: report of case. J Dent Child. 1998;65(1):41-6.
3. Tse CS. Correction of single-tooth anterior crossbite. J Clin Orthod. 1997;31(3):188-90.
4. Graber TM. Orthodontics: principles and practice. 3rd ed. Philadelphia: W. B. Saunders; 1988.
5. Tsai HH. Components of anterior crossbite in the primary dentition. J Dent Child. 2001;68(1):27-32.
6. Jirgensone I, Liepa A, Abeltins A. Anterior crossbite correction in primary and mixed dentition with removable inclined plane (Bruckl appliance). Stomatologija. 2008;10(4):140-4.
7. Lee BD. Correction of crossbite. Dent Clin North Am. 1978;22(4):647-68.
8. McEvoy SA. Rapid correction of a simple one-tooth anterior crossbite due to an over-retained primary incisor: clinical report. Pediatr Dent. 1983;5(4):280-2.
9. Valentine F, Howitt JW. Implications of early anterior crossbite correction. J Dent Child. 1970;37(5):420-7.
10. Bayrak S, Tunc ES. Treatment of anterior dental crossbite using bonded resin-composite slopes: case reports. Eur J Dent. 2008;2:303-7.
11. Proffit WR, Fields HW, Sarver DM. Contemporary orthodontics. 3rd ed. St. Louis: Mosby; 1999.
12. Major PW, Glover K. Treatment of anterior crossbites in the early mixed dentition. J Can Dent Assoc. 1992;58(7):574-8.
13. Hannuksela A, Vaananen A. Predisposing factors for malocclusion in 7-year-old children: with special reference to atopic diseases. Am J Orthod Dentofacial Orthop. 1987;92(4):299-303.
14. Olsen CB. Anterior crossbite correction in uncooperative or disabled children: case reports. Aust Dent J. 1996;41(5):304-9.
15. Estreia F, Almerich J, Gascon F. Interceptive correction of anterior crossbite. J Clin Pediatr Dent. 1991;15(3):157-9.
16. Jacobs SG. Teeth in crossbite: the role of removable appliances. Aust Dent J. 1989;34(1):20-8.
17. Croll TP. Fixed inclined plane correction of anterior crossbite of the primary dentition. J Periodontol. 1984;9(1):84-94.
18. Vadiakas G, Viazis AD. Anterior crossbite correction in the early deciduous dentition. Am J Orthod Dentofacial Orthop. 1992;102(2):160-2.
19. Ngan P. Biomechanics of maxillary expansion and protraction in Class III patients. Am J Orthod Dentofacial Orthop. 2002;121(6):582-3.
20. Asher RS, Kuster CG, Erickson L. Anterior dental crossbite correction using a simple fixed appliance: case report. Pediatr Dent. 1986;8(1):53-5.
21. Croll TP, Lieberman WH. Bonded compomer slope for anterior tooth crossbite correction. Pediatr Dent. 1999;21(4):293-4.
22. Skeggs RM, Sandler PJ. Rapid correction of anterior crossbite using a fixed appliance: a case report. Dent Update. 2002;29(6):299-302

How to cite this article: Pandey S, Singh A, Pandey A, Jagatramka B, Ingavale N, Patel A. Anterior Crossbite Correction in Early Mixed Dentition Period Using Catlan's Appliance: A Case Report. J Adv Oral Health 2024;1(1):28-30.

Source of Support: Nil, **Conflict of Interest:** None Declared.