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RESEARCH ARTICLE

MANAGEMENT OF ANTERIOR CROSSBITE USING CATLAN'S APPLIANCE IN THE EARLY MIXED DENTITION PERIOD - A CASE REPORT

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Abstract

In the early mixed dentition period, single tooth anterior crossbite is the commonly encountered problem. Once identified, the treatment modality should be simple, non invasive, involves little chair side time, requires minimal patient cooperation, and gives rapid correction of the crossbite without affecting the surrounding structures. Different treatment options such as removable and fixed appliances have been suggested by various authors in the past literature such as tongue blade therapy, Catlan's appliance (lower inclined bite plane), crowns (either stainless steel or composite build-up), Hawley's retainer with double cantilever springs, labial and lingual arch wires. Patient compliance with a removable appliance can often be an issue in young children. This paper presents a case of anterior crossbite corrected using the Catlan's appliance within a short period of three weeks without any damage to the tooth or the periodontium. This fixed appliance is a simple and economical method which does not depend on patient cooperation to reverse the bite.

Introduction:-

The transition stage from primary to permanent dentition is the time period which mainly presents with malocclusion due to various factors. Among the development problem most frequently seen is the anterior crossbite in the mixed dentition period. [1, 2] Most important advantage of early interception is that the malocclusion can be corrected non surgically and without extraction of permanent teeth. [3, 4]

Anterior crossbite is defined as a malocclusion resulting from the lingual positioning of the maxillary anterior teeth in relationship to the mandibular anterior teeth. [5] Anterior crossbite is also defined as upper frontal primary or individual permanent teeth lingual position in relationship to the lower incisor teeth. [6]

The anterior crossbite may result from various reasons like lingual erupting maxillary anterior incisors; cleft lip; supernumerary teeth anteriorly; an over-retained deciduous tooth/root; crowding; inadequacy in arch length; upper lip biting habit.[7] This developing abnormality necessitates immediate treatment to avoid anterior teeth fracture & mobility, periodontal inflammation & TMJ problem. [8]

There are various methods to treat the developing or developed anterior crossbite such as using tongue blade therapy, Catlan's appliance (lower inclined bite plane), crowns (either stainless steel or composite build-up), Hawley's retainer with double cantilever springs, labial and lingual arch wires. This case report presents a simple & economical method to treat anterior crossbite using Catlan's appliance. [9]

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Case Report

A 8-year-old female patient reported to the Department of Pedodontics and Preventive Dentistry, Himachal Dental College, Sundernagar, Himachal Pradesh with a chief complaint of poor esthetics in the front tooth region. On clinical examination, anterior crossbite was observed in relation to maxillary right central incisor (Fig 1). Parents were informed about the treatment, and a written consent was documented. The crossbite was treated with Catlan's appliance within a span of three weeks, and the bite was reversed without any undue problems to the child. The case reported here was in early mixed dentition and had class I molar and canine relationships. Alginate impressions of both arches were taken, and an acrylic inclined plane with a slope of 45 degree angulations to the long axis of the tooth was established. The inclined plane was cemented on to the mandibular anteriors with zinc phosphate cement (Fig 2). After the cementation, the only contact point was present at the incisor region in state of occlusion. The patient was advised to maintain good oral hygiene and recalled every week to clinically evaluate the progress of the treatment. The parents were told that the child's bite will feel unusual for a while, but the child will adjust to it and a softer diet than usual was suggested for the first few days after the cementation. Following correction, the Catlan's appliance was removed, the enamel surface was polished, and topical fluoride (APF gel) was applied (Fig 3). Recementation was not required due to the adequate retention of the appliance during the follow-up examinations.

Discussion:-

Anterior crossbite is a condition which corrects by itself because the maxillary incisor is locked behind the mandibular incisors and continues to progress leading to severe malocclusion, thus early treatment can re-establish proper muscle balance and a well balanced occlusal development. [10]It has a reported incidence of 4- 5% and usually becomes evident during the early mixed dentition phase. [11, 12] The ideal age for the correction is between 8 to 11 years during which the root is being formed and the tooth is in the active stage of eruption. [10]

There are different treatment approaches for the correction of anterior crossbite in the early mixed dentition period. These include tongue blade therapy [13], reverse stainless steel crowns [14], Catlan's appliance, removable Hawley's retainer with anterior Z-springs [15] and bonded resin composite slopes [16]. The tongue blade therapy is successful only with patient cooperation, and there is no precise control of the amount and direction of force applied. The reverse stainless steel crowns have been shown to be successful but the two main disadvantages are the unaesthetic appearance of the crown form and the limitations of working with an inclined slope that is already formed. A removable appliance also requires patient cooperation and parental supervision. [10]

The early mixed dentition stage provides an ideal platform to use Catlan's appliance and reverse the bite. To use this appliance, the practitioner has to first distinguish crossbite of dental origin from those of skeletal origin. [8] Dental crossbite involves localized tipping of a tooth or teeth and does not involve basal bone. [16] According to Profitt, correction of anterior crossbite requires first opening of enough space, then bringing the displaced tooth or teeth across the occlusion into proper position. [10]

The case selection for using Catlan's appliance determines the success of the treatment. Lee in 1978 gave basic factors to consider before selecting a treatment method [17]:

1. Sufficient space in arch for repositioning the teeth.
2. Sufficient overbite to keep the teeth in position after correction
3. Apical position of the teeth in crossbite that is the same as it would be in the normal occlusion
4. Class I occlusion.

The Catlan's appliance works on the principle of Newton's third law of motion, the resin slope functions to tip an anterior tooth labially while the mandibular tooth is tipped slightly in the lingual direction. [14]

The kind of treatment selected should be comfortable to the child, should not damage surrounding tissues, should give rapid crossbite correction, and does not interfere with growth and development. [18] That's why in above case Catlan's appliance was given to patient as it require minimum patient cooperation and is economical, fast and easy to fabricate. [19]

Conclusion:-

The case discussed above, shows that Catlan's appliance is a satisfactory and cost effective alternative for correction of anterior crossbite. The correction was observed within three weeks, with no damage to teeth or marginal

periodontal tissue. Early interceptive orthodontic treatment can potentially eliminate the need for future complicated and costly orthodontic treatment.

Figures

Fig 1:- A 8-year-old girl showing anterior crossbite.

Fig 2:- Catlan's appliance (Lower Inclined Bite Plane) cemented.

Fig 3:- Post treatment incisor relation after 3 weeks.

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