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## Anterior Crossbite in Primary Dentition Treatment with Strip Crowns: A Case Report

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### **Abstract:**

*Anterior crossbite correction in primary dentition poses a challenging dilemma for the clinician, since most of the treatments available are designed to be used in mixed or permanent dentition. The rationale for early treatment is to correct the existing or developing skeletal, dentoalveolar and muscular imbalance, to improve the oral environment & to provide more pleasing facial esthetics, thus improving the psychosocial development of child.*

*Kids are usually unco-operative at younger age; hence treatment acceptance, patient co-operation & compliance are important factors to be considered. In this article we have used Strip crowns, this procedure is simple & quick with minimal discomfort, patient compliance not required, & has the added advantage of esthetics. The anterior crossbite was successfully treated in 2 weeks. A 2 yr follow-up showed that the occlusion stabilized into a sagittal normal relationship, permitting normal dentofacial growth & development to continue.*

**Keywords;** Anterior crossbite, Primary dentition, Strip crown

### **1. Introduction**

Anterior crossbite is defined as a malocclusion resulting from the lingual positioning of the maxillary anterior teeth in relationship to the mandibular anterior teeth<sup>[1]</sup>. It is a major esthetic and functional concern to the parents during the developmental stage of a child. An old orthodontic maxim states “the best time to treat a crossbite is the first time it is seen.”<sup>[2]</sup>. Timing of orthodontic treatment has always been the subject of much debate over the years, with many variables being studied in depth. Areas investigated include<sup>[3]</sup>

- clinical effectiveness
- psychological benefits
- influences on the duration and outcome of treatment
- cost effectiveness

Despite self-correction of the anterior crossbite in some patients during transition, skeletal abnormalities remain<sup>[4]</sup>. On the other hand, if self-correction does not occur, the anteroposterior relationship between the mandible and maxilla becomes worse with growth.<sup>[5]</sup> Postponing treatment results in prolonged treatment of greater complexity, growth modifications, dental compensations, permanent deviation, craniofacial asymmetry, potentially deleterious masticatory patterns, increase in condylar deviation & TMJ sounds, Interference with growth of the middle third of the face, Abnormal speech patterns, Loss of arch integrity, Periodontal disease, Undesirable esthetics, Root resorption of central incisors.

The rationale for early treatment is to correct the existing or developing skeletal, dentoalveolar and muscular imbalance, to improve the oral environment & to provide more pleasing facial esthetics, thus improving the psychosocial development of child. Nevertheless, a higher rate of success can be expected in young patients in whom a skeletal discrepancy has not yet been established. Even if a

second phase of treatment becomes necessary, it will probably be simpler and shorter if permanent asymmetries have been prevented during prepubertal growth<sup>[6]</sup>. Tsai reported that a smaller anterior cranial base, a retruded position of the maxilla, and a smaller interincisal angle are associated with anterior crossbite in children<sup>[1]</sup>.

Anterior cross bite in primary dentition can be due to three reasons<sup>[7]</sup>. Abnormal inclination of maxillary and mandibular incisors, Skeletal discrepancy between maxilla and mandible or Occlusal interference

Most of the proposed treatments for anterior crossbite have been designed to treat during the transitional dentition (eg, quadhelix with extended anterior arms) and permanent dentition (eg, Hawley plate with anterior springs), but not the primary dentition. An alternative for treatment during the primary dentition is the chin-cap. It has been shown that using such an appliance for a long period improves the relationship between the mandible and maxilla by suppressing the mandible's anteroinferior growth. However, rebound after ending treatment and excessive load applied to the TMJ has been reported.<sup>[8]</sup>

Removable appliances, fixed inclined planes<sup>[12]</sup>, Reverse twin block<sup>[13]</sup>, Bruckel appliance<sup>[9]</sup>, Planas' Direct Tracks (PDTs)<sup>[6]</sup> have been proposed to treat this malocclusion at an early age. Compliance is always an issue when treating with these types of appliances, tedious lab work, frequent patient appointments, aside from the challenge a professional faces while delivering an appliance to a child in the primary dentition. Reversed stainless steel crowns have also been proposed to correct anterior crossbite. This technique, however, has disadvantages, such as the difficulty of adapting a preformed crown to fit the incisors and the metallic appearance.<sup>[10]</sup>

The purpose of this paper is to present a treatment alternative for anterior crossbites by buccally modifying the inclination of the primary maxillary incisors with esthetic composite strip crowns. This technique is proposed for patients who do not co-operate well, crossbite can be treated in an easy manner without worrying about patient compliance and behavior.

## 2. Case Report

A 3year, 5month-old South Indian girl reported to V.S dental hospital. Parents were concerned about their child's bite and asked if it was possible to treat their daughter's bite at that age. There was no family history of CI III malocclusion. The medical and dental histories were non-contributory.

Clinical examination revealed that the patient had an anterior crossbite from canine to canine, including all the primary anteriors, with a negative overjet (-1 mm) and an overbite of 50%, associated with a Class III canine relationship and significant mesial step at the primary second molars (Figure 1a & 1b). When the mandible was manipulated to centric relation, it was possible to reach an edge-to-edge position with a centric relation/centric occlusion shift of 2 mm. The patient was uncooperative.

A treatment plan was instituted to treat the primary maxillary central & lateral incisors by restoring these teeth with esthetic strip crown and changing the axial inclination of the crowns of these teeth, thereby creating an interference forcing the mandible to slide slightly backward (Figures 2). Treatment was performed with no Local anesthesia, minimal teeth reduction was done. Two weeks later, the mandible was sagittally positioned backward with a normal over jet, overbite: +2mm and the primary canines were in a Class I relationship with a slight mesial step at the primary second molars. (Fig 3). One & half month follow-up showed that the occlusion was stable with a normal relationship between the mandible and maxilla (Fig 4a & 4b). 2 years follow up is done, ideal molar and canine relationship in the primary dentition is maintained (Figure 5a & 5b).

## 3. Discussion

An anterior crossbite is easily identified in the primary dentition either by dentists or by parents who may seek early treatment during that developmental stage. Early treatment is often indicated to counter the unfavorable developmental pattern. One of the shortcomings of early treatment is the possibility of two phase orthodontic therapy as often it is difficult to estimate the further growth of the mandible [11]

Esthetic composite strip crown also apply functional forces to the dentition, including the forces of mastication, which are well tolerated & does not put the patient at risk of TMJ overloading, which may occur when using a chin-cap on a growing child. Furthermore, the technique used here does not require local anesthesia, as minimal crown preparation is performed on the enamel tissue.

There are not many reports in the literature about the use of strip crowns in correction of anterior crossbite. Restoring primary maxillary incisors with esthetic pediatric crowns and slightly changing the longitudinal axis of the crowns is a viable alternative for early anterior crossbite treatment, which were placed in such a manner as to create interference when the teeth were occluded, & guides the mandible to posturing backward at the final occluding of the teeth, bringing the child's occlusion into a normal relationship and permitting dentofacial growth and development to continue into a more normal pattern.

It may involve lingual movement of mandibular teeth, labial movement of maxillary teeth, or both<sup>[12]</sup>. Although a posterior open bite and excessive force on the periodontium of the primary maxillary and mandibular incisors may be produced immediately after placing the crowns, these problems are transitory. The follow-up after 2 weeks showed that the mandible rapidly moves backward, closing the posterior open bite. Crowns on central incisors were lost in between the follow-up visits, due to heavy forces applied by eating sugarcane, reresoring the crowns was not required since minimal tooth reduction was done & crossbite correction was achieved. Further, 2 yrs follow-up showed that the occlusion was stable, maintaining a normal sagittal relationship between the mandible and maxilla, as well as a normal canine and molar relationship in the primary dentition. Patient was free of any symptoms like pain or sensitivity. Case selection is very important for the success of the treatment. Age of the patient, amount of root resorption are important criterias to be considered. Distribution of forces should be done by crowning more than one teeth, to avoid excess forces & prevent premature exfoliation of deciduous teeth.

Clinically, the important question is whether or not the patient can occlude squarely edge to edge on the upper & lower incisors. The ease with which the patient can achieve this position is an indication of the prognosis for correction. The most favorable cases for correction present a postural class III, where the incisors can meet comfortably edge to edge but the patient is forced to move the mandible forward in order to occlude on the posterior teeth. If an edge-to-edge occlusion is achieved only with difficulty, the prognosis for orthodontic correction is poor. [13]

Although the patient is still in the primary dentition, permanent incisors are expected to erupt in a normal relationship as the treatment repositioned the mandible backward. The maxillary permanent incisors, however, develop lingually to their primary incisors and might erupt into crossbite.

The technique used in this case, tipping buccally the longitudinal axis of the crowns in the primary maxillary incisors to correct an anterior crossbite in the primary dentition—has advantages over other techniques proposed in the literature. First, it does not involve taking dental impressions and laboratory fabrication, which is necessary when treating with fixed or removable appliances. Second, this esthetic treatment compared with stainless steel crowns is more acceptable to parents and children. Third, in patients with a sensitive gag reflex, maintaining an open mouth long enough to build the PDTs on the primary molars is a problem. Placing the esthetic crowns on the primary maxillary incisors is easier and does not stimulate that reflex. Last, enamel reduction is minimal and can, in most cases, be performed without any infiltrative anesthesia. Therefore, anterior crossbite is a malocclusion easily identified in the primary dentition; thus, its treatment should be considered as early as possible to permit the dentofacial complex to continue growing and developing into a physiological pattern. Early treatment of malocclusions, such as anterior crossbite, can minimize or eliminate future treatment by reducing the needs of more costly and complex orthodontic treatment. The case presented here further confirm that the optimal timing to improve an abnormal skeletal relationship developing in growing patients with anterior crossbite is in the primary dentition. [6]

#### 4. Conclusion

The case report described clearly demonstrate, the versatility of using strip crowns. The functional improvement coupled with the obvious psychological benefit gives this simple, comfortable, esthetic, efficient, easily placed & faster correction technique, a significant advantage over the traditional method of treating these potentially challenging problems in primary dentition, especially in unco-operative young patients, while excluding the patient compliance. By addressing these requirements, esthetic strip crowns satisfy both the patient & the dentist as it is one of the most patient friendly of all functional appliance mentioned in the literature. However further studies & long terms follow up, to fully evaluate the efficacy of this technique is required.



Figure 1a: Pre-Operative



Figure 1b: Pre-Operative



Figure 2: After the Procedure



Figure 3: 2 Weeks post operatively





Figure 4a: 1.5 months post operatively



Figure 4b: 1.5 months post operatively



Figure 5a: 2 yrs follow-up



Figure 5b: 2 yrs follow-up

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