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The STOP Appliance - Simultaneously treating orthodontic problems

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Abstract---The interplay between the intraoral and extra oral muscles plays a major role in stability and position of dentition and surrounding structures. This equilibrium is affected by oral habits. Oral habits play a major role in the development of malocclusion and also affect the surrounding hard and soft tissues. To minimize their effects, it is important to intercept the habit as soon as possible which will in turn reduce the treatment time with fixed orthodontics. To do so, an appliance is constructed which can treat a combination of problems simultaneously.

Keywords---Developing malocclusion, Habit breaking appliance, Oral habits.

Introduction

Oral habits are a learned pattern of muscle contractions that are repeated on a regular basis without conscious thinking or purpose. Even though these para-functional habits are regarded typical throughout the infantile period, the duration, frequency, and intensity of these habits beyond 3.5 - 4 years of age might cause development of malocclusion.⁽¹⁾

These relatively fixed and uncomplicated activities induce abnormal muscle contractions, disturbing the dentition's and surrounding structures' stability and homeostasis, resulting in malocclusion. Habits have been classified in a variety of ways by authors. According to William James, habits can be characterized as useful or detrimental, as well as functional or para-functional.

Oral habits and malocclusion are connected in the deciduous dentition. Malocclusion is more likely to occur in children who have oral habits than in children who do not have any oral habits. According to a literature review, the malocclusion is more likely to occur in children having oral habits.⁽²⁾ Oral habits were responsible for 40% of malocclusion in a study conducted by Brandhorst et al.⁽³⁾

Several studies have revealed the prevalence of certain para-functional habits among diverse regional populations.^(4,5,6) Children that engage in harmful practices such as pacifier or thumb sucking have a higher prevalence of upper incisor protrusion, anterior open bite, and posterior cross bite.⁽⁷⁻¹⁰⁾

A constricted maxilla is caused by a lower tongue position combined with an imbalance in oral musculature while sucking, resulting in a posterior cross bite.^(11,12) The most typical treatment for these para-functional habits is to remove the etiology via retraining devices or restraining apparatus. Because compliance is required during this stage of treatment, patient counselling is essential.

A great number of appliances have been documented previously in the literature, but we suggest a treatment option for usage during the early mixed dentition phase that can cure multiple para-functional habits in children at the same time. Construction of the STOP appliance involves the following steps:

Case selection

The appliance is appropriate for patients with a mixed dentition in the early stages of development. These habits are considered normal until a child reaches the age of 3.5 to 4 years, after which they should be discontinued. A maxillary arch impression is made and a cast is poured once the case selection criteria are met.

Armamentarium

The three main components of the STOP appliance include:

1. Adams clasp
2. Tongue crib

3. Acrylic base plate

The Adam's clasp is constructed using a 21-gauge stainless steel wire for the deciduous second molar or permanent first molar. The Adam's clasp should be firmly adapted to the molar as retention plays a key role in achieving the optimum result.

The second wire component is the tongue crib. 3-4 spurs can be given with a 21-gauge wire depending upon the arch width. The tongue crib should be constructed in such a way that it extends from canine to canine and follows the contour of the palate. It should lie 2mm below the incisal edges of anterior teeth.

An acrylic bead can be incorporated into the tongue crib.⁽¹³⁾ This process acts as a reminder and places the tongue at the correct position. Along with this ball end clasps can be given if additional retention is required. Figure 1 shows the frontal view of the appliance.

Once these wire components have been made, acrylization is done. Heat cure acrylic is used in order to provide adequate strength and prevent monomer leaching. An incline plane of 60 degrees with incisal capping is constructed. The incline plane extends and forms an incisal capping covering incisal one third of the height of the anterior teeth. Figure 2 shows the occlusal view of the appliance.



Figure 1: Frontal view of the appliance



Figure 2: Occlusal view of the appliance

Discussion

Tongue thrusting is a frequent habit that develops during the early stages of the mixed dentition. In nature, it can be anatomical, physiological, habitual, or functional. By retraining the muscles or utilizing a mechanical restraining device, the habitual form of tongue thrusting can be abolished. One of the most frequent restraining devices is the tongue crib, which places the tongue at the level of the incisive papilla. A little acrylic bead with a diameter of 3mm is included as a training device. Incisal capping, which is done on all of the maxillary incisor teeth, stops the youngster from biting their nails, lips, or pencils. Furthermore, it prevents the flare of the maxillary anterior teeth.

The incline plane and incisal capping aids in correction of anterior cross bite and prevents supra eruption of incisors. It also aids mandibular development by removing distal interlocking.

The STOP appliance is best used during the early mixed dentition era, with the goal of arresting the habit as soon as it is detected and boosting mandibular growth before undergoing any proven growth modification techniques. This reduces the length of fixed orthodontic treatment, which benefits both the patient and the orthodontist. It is simple and easy to fabricate but at the same time an innovative appliance that can intercept simultaneously occurring para functional habits in one solution and thereby avoids the discrepancy in occlusion.

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