Habit Breaking Modified Groper’s Appliance: A Case Report

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ABSTRACT

A missing primary tooth may create issues like loss of masticatory efficiency, compromised esthetics, pronunciation problem of labiodentals sounds, and the formation of abnormal oral habits. For example, a tongue-thrusting habit may develop due to the habitual protrusion of tongue into a space formed by a lost anterior tooth. Developing tongue thrusting can lead to many complications like proclination of upper anterior teeth, narrowing of the arch, increased overjet and overbite, etc. In this article, we will discuss a case of a child, with intruded anterior tooth due to trauma resulting in a developing tongue-thrusting habit, which was treated with a modified Groper’s appliance in which a palatal crib was incorporated to correct the tongue-thrusting habit. The modified Groper’s appliance occupies the created space and treats the etiology of habit, along with its action as a fixed functional esthetic space maintainer while the palatal crib will correct the habit by acting as a mechanical restrainer.

KEYWORDS: Intruded primary tooth, developing Tongue thrusting, modified Groper’s appliance with palatal crib

INTRODUCTION

One of the most common childhood traumatic dental injury, which causes displacement of the tooth into the alveolus is an intrusion or intrusive luxation. These injuries are mostly experienced in deciduous anterior teeth. In this type of injury, a force in an axial direction results in the displacement of the tooth within its socket. This condition leads to a variety of pathologic alterations to permanent teeth, including hypoplasia, dilacerations of crown and root, partial or complete arrest of root formation, sequestration of the permanent tooth germ, and even disturbances in eruption. For every single case, the treatment protocol varies according to the severity of the injury.

However, if a long-standing intruded primary anterior tooth goes untreated, it creates a space where the tongue may protrude. This situation leads to developing the tongue-thrusting habit. This habit can be managed by the elimination of the etiology, which is the primary and the most important goal in the correction of the tongue-thrusting habit. Once the cause is identified and removed, the tongue thrusting habit is usually dealt in two ways: the first method is Muscle retraining—an exercise technique to reeducates the muscles associated with swallowing and the second is mechanical restraining method, where an appliance is placed in the mouth which will restrict the tongue from thrusting forward and thus retracts the tongue to a normal position.

In this case report, a fixed esthetic space maintainer in the form of Groper’s appliance was fabricated following extraction of the decayed intruded tooth. This appliance will maintain the space created by the missing anterior tooth; a palatal crib was incorporated into the Groper’s appliance to intercept the habit.

CASE REPORT

A 5-year-old female patient visited the outpatient Department of Pediatrics and Preventive Dentistry with the chief complaint of intruded 51 following an injury 4 years back. The patient does not give any significant family history, medical history, and any other dental history.

Clinical Examination: Intraoral examination revealed an intrusion of 51. (Fig1&2) The examination also revealed a developing tongue thrusting habit in the child due to missing upper anterior teeth. The extra-oral examination

Figure 1: Pre Operative Intra Oral Examination
did not bear any significant findings.

**Radiographic Examination:** Intraoral periapical radiograph revealed, grossly decayed intruded 51 which was impinging the gingiva. (Fig 3)

**Treatment Plan:** The extraction of grossly decayed intruded 51, followed by a fixed functional space maintainer (modified Groper’s appliance) incorporated with a palatal crib was planned for the treatment.

**Appliance Design:** The intruded 51 was extracted (fig 4). The socket was left under observation for 2 weeks for healing to occur properly. In the present case, 55 and 65 were elected as abutments for the anterior space maintainer, on which bands were adapted. The primary impression was then taken with the help of alginate, the irreversible hydrocolloid, accompanying the banding on 55 and 65. The casts were poured with dental stone - a type III gypsum product with the recommended water/stone ratio. On the upper cast, a stainless steel framework was made extending from 55 of one side to 65 to the other side, similar to a Nance palatal arch. A wire was then soldered to the bands sited on the chosen abutments (fig 5 & 6). An acrylic extension was being flowed from the palatal to the labial vestibule over that wire. An acrylic tooth, trimmed to the size of primary teeth was placed directly over the alveolar crest on the acrylic extension. A palatal crib was incorporated into the acrylic extension (fig 5 & 6). Occlusion was then checked and adjusted on the cast and in the patient’s mouth. After the necessary trimming and polishing, the appliance was delivered to the patient by cementing it with the abutments by glass-ionomer cement Type I(fig 7&8).

Proper oral hygiene maintenance instructions were given to the child and her parents. The patient was instructed to visit the outpatient department for a periodic dental checkup.

**DISCUSSION**

Intrusive luxation injuries are treated depending on the severity of the case. In the present case, the patient reported of such an injury in deciduous right maxillary central incisor four years back. The radiograph further revealed the intruded tooth to be grossly decayed. Due to this, the intruded tooth was extracted. It was also found...
that the child has developed a tongue thrusting activity due to the tongue habitually protruding into the space created by the intruded tooth.

Loss of anterior teeth often results in difficulty in speech development, especially in children. It is also a setback for a child to have lost a tooth at an early age, and it may lead to the development of tongue-thrusting habits. In such patients, a fixed space maintainer improves speech, aesthetics, and self-esteem. Hence, a modified Groper’s appliance was planned. This fixed functional space maintainer provides numerous advantages in terms of esthetics, refurbishment of masticatory and speech efficacy, and prevention of deleterious oral habit development.

The developing habit was planned to be intercepted by the removal of etiology and mechanical restraining. Sayın MO et al. monitored the initial effects of the tongue crib using Magnetic Resonance Imaging. According to them, when a palatal crib was inserted in the mouth, the tongue tip was forced to be positioned more posteriorly, and to compensate this phenomenon, adaptive changes took place in the anterior and mid part of the dorsum of the tongue. A lack of success was documented by Subtelny and Sakuda where the patient wore the crib for less than 6 months. For this reason, we decided to give a crib therapy, using a fixed palatal crib appliance that would be left in the mouth for more than 6 months. It has been well documented that using a compliance-free, fixed appliance for the correction and inhibition of habits produces more commendatory results. Therefore, a tongue crib was incorporated into the Groper’s appliance.

The accumulation of food debris and plaque is the major drawback of such kind of fixed appliances. Therefore, parents have to be trained well for the supervision of oral hygiene habits, practiced by their child.

CONCLUSION

A dual-action appliance in the form of modified Groper’s appliance with incorporated palatal crib was fabricated in this case. This will act as a space maintainer and will correct the tongue-thrusting habit as well.

REFERENCES


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