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# ANTERIOR AESTHETIC REHABILITATION WITH GROPER'S SPACE MAINTAINER MODIFIED WITH TONGUE CRIB: A CASE REPORT

Dental Science

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## ABSTRACT

One of the challenging tasks for a pedodontist is the aesthetic rehabilitation in young toddler following early childhood caries and extensive dental trauma. So, an appliance can be fabricated to replace the lost tooth structure. The main factors to be considered are patient co-operation and parents' desire and willingness for replacement. A 5-year-old child reported with missing upper anterior teeth following trauma and also gave an history of thumb sucking habit for the past two years. Considering the space maintenance, masticatory function, speech development, and tongue habits, an anterior fixed space maintainer, named after Groper was fabricated with tongue cribs added as a modification. The tongue cribs were removed after withdrawal of the habit and the appliance was recemented. This paper discusses in detail about this modified groper's appliance, a fixed anterior aesthetic appliance.

## KEYWORDS

Missing Upper Front Teeth, Thumb Sucking Habit, Modified Groper's Appliance, Fixed Anterior Aesthetic Appliance.

## INTRODUCTION:

In the modern civilized, cosmetic conscious world, well aligned teeth are the standards of elegance indicating nutritional health, self-esteem and economic status. But, in the contemporary world, children are found to be affected with early childhood caries and dental trauma. Early childhood caries (ECC) and dental trauma are the main reasons for premature loss of both anterior and posterior teeth during the infancy and toddler period.[1] The consequences being faced are loss of teeth and various dental diseases besides lifelong aesthetic issues. The parents with different economic status would rather seek solution to the high aesthetic concern of the children. Rehabilitation of young toddlers who suffered multiple tooth loss subsequent to extensive trauma or early childhood caries is a challenge to paediatric dentists as it maintains the child's psychological and oral health.

The essential factors considered for rehabilitation are space maintenance, better masticatory function, speech development and phonetics. The maxillary primary incisors are important for development of speech and their early loss has minimal impact on mastication. A child with caries or affected by dental trauma experiences difficulty in developing lingual sounds, its speech may be affected. Therefore, it is important to rehabilitate the teeth for development of speech and aesthetics.

Untimely loss of primary anterior teeth is one of the most common etiological factors in the development of malocclusion and certain oral habits. Space maintainers are provided to prevent malocclusion and deleterious oral habits in later life.[2] Paediatric dentists adapt different treatment protocols for anterior aesthetic rehabilitation to children including child with habits like thumb sucking, tongue thrusting, mouth breathing, bruxism and nail-biting. The results of the case studies are published in conferences and journals. A variation on the fixed bilateral space maintainer is the pedi-partial or Groper appliance. This also has a very specific indication as a replacement for missing maxillary incisors.[3] This case report highlights the progressive development of a case rehabilitated using a modified Groper's appliance with tongue crib and corrects both simultaneously.

## CASE REPORT:

A five-year-old male patient reported to the Department of Pedodontics and Preventive dentistry, Thai Moogambigai Dental College and Hospital, Chennai, Tamil Nadu, India with the chief complaint of missing upper front teeth due to fall during play in school three weeks back. Parents reported the low self esteem of the child due to the loss of teeth and also give history of thumb sucking habit from birth and failure of several attempts to correct the habit even after using chemical therapy and reminder therapy. On clinical examination, it was found that the primary maxillary right and left central incisors were avulsed following trauma.

### PRE-Operative photos

**Fig no. 1 OCCLUSAL VIEW**

**Fig no. 2 FRONTAL VIEW**

## RADIOGRAPHIC INVESTIGATION:

On radiographic examination; intraoral peri apical radiograph revealed missing 51 and 61 and the underlying tooth-like structure indicated the presence of 11 and 21 at 5th Nolla's stage. The remaining alveolar bone thickness from the underlying tooth structure to the crest was measured to be 4 mm.

## TREATMENT PLAN:

Considering the chief complaint and diagnosis, a treatment plan was decided following which upper and lower alginate impression were made for study model. Though there are many appliances available for aesthetic rehablitaion of primary anterior tooth, Groper's appliance is considerad more successful and comfortable for this patinet. A modification of Groper's appliance with tongue crib was designed to replace the missing tooth, correct the thumb sucking habit and as a space maintainer.

## APPLIANCE DESIGN:

Fig no.3 GROPER'S APPLIANCE WITH TONGUE CRIB AFTER 6 MONTHS FOLLOW-UP

Patient's parents were explained about the appliance designed for rehabilitation of the missing 51 and 61 along with habit breaking appliance and an informed consent was obtained. Prefabricated stainless steel molar bands of size 32+ were adapted to the primary second molars and impressions were made using alginate. Bite registration was made using modelling wax. Using type III gypsum working model was prepared. Round wire of 0.036 inch diameter was used for wire bending of this applaince. Distal free ends of the wire were soldered to the molar bands with a U loop in the anterior region to support the acrylic teeth. Later, acrylic teeth were trimmed according to the size required and attached to the U loops created with acrylic resin with 1mm of gingival clearance. As a modification to this appliance, the palatal cribs were fabricated and soldered along the palatal surface of the canines along the course of the 0.036 inch wire with 2mm of gingival clearance.

Fig no 4 PRE- OPERATIVE

Fig no. 5 POST OPERATIVE

Fig no.6 OCCLUSAL VIEW

Fig no.7 FRONTAL VIEW

**ADVANTAGES:**

Habit correction and functional space maintainer are achieved in a single appliance. It helps in speech development, prevents from development of other adverse habit like tongue thrusting. It also performs well continuously for a longer period and more preferred over removable appliance by both patient and the dentist.[4]

**LIMITATIONS:**

Prolonged use of the appliance along with tongue crib can cause interference with speech development, gingival hyperplasia and interference with arch expansion can result banding of molars can result in mild demineralization. Applaince is contrainticated in patients with seizures; mental retardation; very poor hygiene; immune compromised patients; poor ability to follow-up; and significant deep bite, over-jet or anterior crossbite.[5]

**REVIEW:**

The modified Applaince was cemented using type-1 GIC and post operative intructons were given to both the parent and the child. In three month follow up, it was found that the modified appliance worked well and proved effective in correction of thumb sucking habit and in restoring the aesthetics; function and speech. In a six months follow up the patient reported with no thumb sucking. So, the appliance was modified by removing the tongue crib by trimming and the surfaces were smoothened before recementing the appliance.

Fig no.8 TONGUE CRIBS REMOVED AND RECEMENTED

**DISCUSSION:**

The primary anterior teeth are being missing or lost mostly at the age between 2 and 4 years due to trauma or caries causing extensive destruction.[6] In the present case, patient reported with the loss of primary anterior teeth following a trauma and also gave history of thumb sucking habit for the past two years. It was evident that, after the avulsion of the anterior teeth, the child had developed a low self-esteem.

According to Dimberg L et al the prevalence of sucking habit was 66% and dummy sucking was dominating and in connection with more malocclusion traits than finger/thumb sucking. A significant association was found between the sucking habits and the most prevalent malocclusions, anterior open bite, Class II occlusion, increased overjet and posterior crossbite.[7]

It has been reported in other studies that the aesthetic rehabilitation of primary anterior teeth has a vital psychological impact on recovery of patient's self-esteem.[8] The progress of children in school and their psychological well-being can be adversely influenced by the condition of their anterior teeth.[1,9] The motive behind replacing the missing anterior incisors is to restore an expectable pleasing look and providing an opportunity for normal psychological growth and development of the child in a premature age. The fixed space maintainers are more advantageous when compared to the removable one.[10]

The oral habits can interfere with the growth and normal development of the jaws, favoring the onset of malocclusion and changes in normal swallowing and speech patterns depending on factors such as duration, frequency, intensity, and facial pattern.[11] In the present case, fixed habit appliance was preferred considering the age of the child and co-operation.

It is essential to consider the type of material to be chosen and that is inexpensive and should be able to serve the purpose until the eruption of the permanent teeth without causing interference to the normal eruption process. One such type of aesthetic space maintainer is Groper's appliance which is similar to nance holding arch, but it holds acrylic teeth processed to the wire instead of a palatal acrylic button in the rugae area. [9]In the present case study modification with tongue crib to groper's appliance was done as Gropers appliance showed greater success rate.

Other type of appliance like Splint-it space maintainers have many advantages, including fast insertion, no laboratory costs, can be fixed with limited patient cooperation, no risk of causing damage to abutment teeth, can prevent tipping of abutment teeth, no hamper tooth eruption, and high-durability.[12,13] However, the failure rate of this type of space maintainer was 73% as reported by Artun et al. [12] and 94% Zuhal.[14] These appliances will last for a few months; may be for 6 months as revealed by according to Jain N[15] and Srinivas et al[16] case studies. Success rate of splint-it space maintainer in patients with thumb sucking habit will be even less due to the force exerted by thumb during sucking action.

In the current scenario, the fabricated modified Gropers appliance has the advantage of re-altering after the correction of thumb sucking habit and reduces the cost of fabrication of second appliance. The modified appliance used in the present case study was further modified to Gropers appliance by simply removing the palatal tongue crib and smoothening the surfaces of the wire. Likewise, many case studies used the appliance for replacing lost teeth and correction of thumb sucking habit but no study used modified appliances to treat thumb sucking habit and missing tooth simultaneously.

**CONCLUSION:**

Primary concern of meeting the aesthetic demand and treating thumb sucking habit led to the idea of addressing both the purposes by a modified fixed anterior space maintainer with tongue cribs. The appliance was found to be compatible to the patient and affordable for the parents and both the child and the parent were satisfied by the rehabilitation design. With a six months of follow up, this appliance was found simple to fix and modify, proved effective and promising

effects in restoring the function; speech and aesthetics and in correction of thumb sucking habit of the child.

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