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A simple modification of aesthetic fixed appliance for replacement of avulsed maxillary primary incisors

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Abstract

This article discusses about a fixed dentulous appliance that was constructed to replace the primary upper anteriors in a four year old boy. It constituted of a design, where the maxillary primary second molars were used to support the appliance through bands and a wire that contained an acrylic flange bearing trimmed acrylic teeth, anteriorly. The appliance was functionally and aesthetically compliant.

Keywords: Anterior tooth loss, Aesthetic fixed space maintainer, space loss.

Introduction

Traumatic injuries to primary teeth are very common, especially in children aged less than four year [1]. The maxillary incisors and more specifically, the central incisors, are the most commonly injured teeth [2, 3]. The incidence of traumatic injury to the primary dentition ranges between 4%-30% depending on the location and type. Boys sustain slightly more traumatic injuries than girls; the ratio being 1.2-1.8 to 1 [2]. Majority of injuries to the preschoolers are tooth luxations due to the resiliency of the alveolar bone surrounding the primary teeth, incomplete root formation and relatively short roots. However, various studies have shown that exarticulation (complete avulsion) of primary teeth due to trauma is relatively infrequent. Only 7%-13% of all traumas to the primary teeth involve avulsion. Most frequently, avulsion involves a single tooth, usually an incisor, but multiple avulsions are occasionally encountered [2]. The literature reports many different types of appliances that can be used as fixed space maintainers including Band and loop appliance, crown and loop appliance, distal shoe appliance, Transpalatal arch, Nance palatal arch appliance, Lingual arch and Fixed wire composite space maintainers [4, 5]. In this article, a simple and easy technique is described to fabricate a fixed and esthetic interim space maintainer for lost primary maxillary incisors that does not hamper the growth of alveolar-dental component.

Case Report

A four year old boy reported to the Department of Pedodontics and Preventive Dentistry of Guru Nanak Institute of Dental Science & Research with chief complain of missing upper front teeth region. On examination, 52, 51, 61 and 62 were found to be absent (fig1). The patients parents gave history of avulsion due to traumatic fall about three weeks back. Orthopantomogram revealed no alveolar bone fracture and avulsion of 52, 51, 61 and 62 was noted. A clinical decision was made to fabricate a fixed dentulous appliance for replacing the missing anterior teeth. 55 and 65 were banded (band size: 0.005" x 0.180") and alginate impressions were made for the upper and lower arches.

Casts were poured with Type IV Gypsum Product. On the maxillary cast, a stainless steel wire (0.9 mm) framework was made, spanning from one band to the other, while making a square shape pattern in the anterior region. The anterior wire pattern was made to reinforce the acrylic segment. The ends of the wire were then soldered to the corresponding molar bands (figure 2). In the anterior region of the upper cast, a trial wax up was done with trimmed acrylic teeth. The acrylic teeth were originally of adult size, which had to be trimmed to the primary teeth sizes of 52, 51, 61 and 62.

After all necessary adjustments, dewaxing was carried out and the appliance was heat cured. After necessary trimming and polishing (figure -3 and figure- 4), the appliance was cemented with Fuji type I glass ionomer cement (GC Corporation, Tokyo, Japan) (Fig-5). Post-operative occlusion was checked (Figure 6 and Figure 7). Patient was advised for regular follow ups.



Fig 1: Preoperative clinical view



Fig 2: Working cast



Fig 3: Appliance front view



Fig 4: Appliance palatal view



Fig 5: Appliance Intra oral view



Fig 6: Post operative occlusion



Fig 7: Postoperative Extra oral view

Discussion

The result of anterior tooth loss include esthetic problem, tipping of adjacent teeth, over-eruption of antagonist teeth, midline deviation, masticatory impairment, speech problems and lingual dysfunction [6, 7].

Children with anterior absence of teeth are affected socially and psychologically due to esthetic problem [8]. Absence of maxillary anterior teeth, the lingual sides of which are needed by the tongue for certain phonations, may result in improper speech [9, 10]. It usually affects sounds such as 's', 'z' and 'th' [11]. However, Gable *et al.* found that early loss of incisors had no long term effects on speech [12]. This patient had no masticatory and speech problem, but had complaints with aesthetics.

Contra-indications of inserting anterior fixed appliances may include children with seizure disorders; mental retardation; poor ability to be followed-up; poor hygiene; immune-compromised patients inappropriate feeding habits; and significant deep-bite, over-jet, or anterior crossbite.

The requirement of the space maintainer includes maintenance of space; prevention of over-eruption of antagonist teeth,

restoration of function; allowance for maxillary growth; maintenance of hygiene; durability and low costs ^[6]. The appliance which has been discussed is of the fixed type and it bears none of the disadvantages of the removable type, such as need of the patients' cooperation and chances of breakage.

Unlike the posterior segment, the anterior segment from canine to canine appears to be stable, even after early loss of incisors, with no net loss of space between the canines ^[10]. Moreover, the inter canine growth at four years is minimal (less than 0.5mm) and it is clinically insignificant ^[13]. Changes in arch length with tooth migration generally occur after the eruption of the first permanent molar. At this time the appliance can be removed, as it coincides with the eruption of the permanent central incisors ^[7]. In the crowded dentition, if one or more incisors are lost, there may be some rearrangement of space maintenance is required if the loss occurs after the eruption of the primary maxillary canines ^[14].

Conclusion

Loss of an anterior tooth at younger age may result in psychological trauma to the child. So, restoration of anterior aesthetics with this appliance gave a huge psychological boost for the child and his parents. Besides enhancing the facial aesthetics it acts as functional space maintainers, assist in development of proper speech; prevent development of any untoward oral habits thus aiding sound development for the child during the foundation years.

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