

A Case Report of Aesthetic Functional Space Maintainer Using Natural Tooth Crown: A Novel Approach

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ABSTRACT

Background: Apart from the functional problems, avulsion of anterior permanent teeth in the growing age may result in psychological trauma to the child. In the anterior region, esthetics is a major concern along with function and space management. A modified Nance appliance with natural tooth crowns solves all these purposes efficiently and effectively. In addition, the technique is simple and the appliance is very comfortable inside in the oral cavity. Here is a case of avulsed both right and left central incisors which were replaced by modified Nance appliance with natural tooth crowns. The appliance was found to be functioning satisfactory inside the oral cavity for the last year and a half.

Keywords: Avulsion, Modified Nance appliance, Natural tooth crown, Aesthetics.

INTRODUCTION

Traumatic dental injuries are commonly observed in children and young adults. They comprise around 5% of all injuries. ¹ When the dental injuries per se are taken into consideration, avulsion of permanent teeth consists of 0.5-16%. ² However, because of the lack of parental awareness, the initial visit to the dental hospital following a traumatic episode varies. Loss of an anterior tooth in the growing age, apart from the functional problems associated with it, may result in psychological trauma to the child. The problem may become serious and deep-seated and may result in an imbalanced emotional development of the child. Along with this, although to a lesser extent, the teeth adjacent to the edentulous space may drift into the available space, thus increasing the potential for developing malocclusion at a later stage. ³ A variety of appliances have been developed by various investigators to deal with space management in case of early loss of a primary and

permanent anterior tooth. The choice can be between a removable and a fixed one or it can be anterior, posterior unilateral or bilateral; and functional or nonfunctional. The selection of the appliance depends upon a number of factors, including the child's stage of dental development, the dental arch involved, the tooth, which is missing and the status of the teeth adjacent to the lost tooth.⁴

In the growing age selection of the appliance is very challenging, the removable appliance has a few drawbacks that are wearing of appliance regularly, self-conscious and if they are either too loose or too tight causing excessive pressure on the teeth and mucosal irritation. The advantages of fixed appliances over the removable appliances are minimal discomfort, reduces the need for patient cooperation. The fixed appliance should meet all the criteria such as a space maintainer, function and esthetics. In the present case, we have used a modified Nance appliance with

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Fig 1: Pre treatment intraoral photographs.



Fig 2: Right and left avulsed central incisors (a). Right central incisor mounted in the plaster for composite restoration(b).

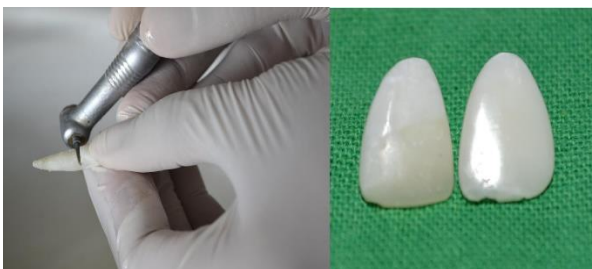


Fig 3: Sectioning crown and root (a). Prepared crowns(b).



Fig 4a: Aesthetic functional space maintainer in place.



Fig 4b: Before and after the treatment.

a natural tooth crown as a fixed functional space maintainer. A natural tooth offers the benefits of being the right size, shape and color when the crown of the tooth is in good condition.

CASE REPORT

A 10-year-old boy accompanied by his parents reported to the Department of Pedodontics and Preventive Dentistry, Sri Sai College of Dental surgery, Vikarabad, Telangana, India, with the chief complaint of replacing the upper front teeth. The medical history and family history of the patient were unremarkable. The case history recording revealed the patient had a bicycle accident one month back; both the central incisors were avulsed. The patient did not visit a dentist after the traumatic episode. The avulsed teeth were preserved in normal water which he brought along with him. Intraoral examination revealed mixed dentition stage, angle class I molar relationship on the both sides and missing maxillary right and left central incisors (Figure-1).

NATURAL TOOTH CROWN PREPARATION

The right avulsed central incisor had an Ellis class II fracture. For the restoration of the tooth, the tooth was mounted in a plaster model (Figure 2) for better handling during composite restoration. The external surface was beveled with a tapered fissure bur followed by acid etching, the bonding agent was applied and composite restoration was given. Then the right central incisor was removed from the plaster model. The access cavity preparation was done and complete necrosed pulp was removed. Both the central incisor crown and root part were separated with a straight fissure bur and roots were discarded (Figure-3a), the prepared crowns were chemically sterilized in Hydrogen peroxide 3% (Arihant Chemicals, Hyderabad) Sodium hypochlorite 3% (Prime Dental Products Pvt LTD, Thane). The prepared crowns are shown in the photographs (Figure- 3b).

FABRICATION OF THE APPLIANCE

Bands were selected according to the mesio-distal measurement of maxillary first molars. An alginate impression was made, the molar bands were removed and stabilized in the alginate impression and the impression was poured with

dental stone. On the working cast, Nance appliance was fabricated with 20 gauge round orthodontic stainless steel wire. For the fabrication of modified Nance appliance, the wire component were extended anteriorly over the edentulous space to hold the crowns in place for better stability, the acrylic part was used as a base for the prepared natural tooth crowns. Both right and left central incisors were acid etched for better retention, placed in proper position and cold cure resin was used for stabilizing the tooth. The modified Nance appliance was soldered on the palatal aspect of the molar bands, the appliance was cemented in 16, 26 and the patient was followed up to one year (Figure-4a, b).

DISCUSSION

Compared to other tooth injuries, avulsion has a more serious assault on the gingiva, the periodontal ligament and the pulp. In clinical studies, teeth replanted within 5 minutes after avulsion had the best prognosis and the chance of pulp and periodontal healing was inversely related to the stage of root development and the period of dry storage. In the optimal scenario, the avulsed tooth should be replanted immediately or should be stored in a physiological medium such as saline for only a short period before replantation.^{2, 5, 6} In the present case report, the extraoral dry time is 30 days, so it could not be considered for replantation.

In situations where an anterior tooth is prematurely lost, a removable functional space maintainer is the one which is most commonly employed. However, there are a number of drawbacks associated with the use of a removable space maintainer, the most important among them being, dependency on the child for the success of the appliance. This is because the child may not wear it or may wear it at his or her convenience. In other words, the efficiency and effectiveness of a removable space maintainer more or less depend on the patient's compliance than on the design and quality of the appliance. Other problems include accidental ingestion or aspiration of the appliance, breakage of the appliance during function or when it is out of mouth and loss of the appliance. In addition to this, a removable appliance may have a deleterious effect on the involved soft tissue and periodontium.³ A fixed appliance like the one used,

in this case, is almost free from all such shortcomings.

The technique employed in the present case here makes the use of natural tooth crowns with modified Nance fixed esthetic functional space maintainer. When the avulsed tooth is used, it has an added advantage of preservation of natural tooth form, contour and translucency and thereby rendering psychological benefit to the child.

CONCLUSION

Loss of permanent anterior tooth in a growing child may have a psychological impact, affecting the child self-esteem and socialization. Thus, to address the functional and esthetic problems associated with the loss of an anterior permanent tooth, the present appliance was placed using a simple technique which was aesthetically and functionally satisfactory and could maintain the space until the definitive treatment was planned such as implant/fixed prosthesis later in the future.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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