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Olgu Sunumu ve Literatür Derlemesi

Provisional Restoration of Anterior Edentulous Space Using Extracted Primary Teeth Crowns in A Fixed Appliance After Dental Trauma: A Case Report

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Abstract

Premature loss of primary teeth could be treated with different options. In this case report, a 4-year-old girl was referred to our pediatric dentistry clinic for the treatment of dental trauma and pain. In clinical and radiographical evaluation, mobility in both primary maxillary central incisors, inflamed marginal gingival tissues, swelling of upper lip and a root fracture were detected. Both primary maxillary central incisors were extracted and anterior edentulous space was provisionally restored using extracted primary teeth crowns in a fixed appliance. Parents and patients' satisfaction levels were evaluated before and after treatment. The fixed appliance was still healthy after a follow-up examination period of 12 months. Parents and patients' satisfaction levels were approximately very satisfied. This case report presents an alternative treatment option - functional, esthetic and satisfactory for parents and patient- for the treatment of the premature loss of traumatized primary maxillary central incisors.

Key Words: Fixed appliance, Primary teeth, Root fracture

Introduction

Dentists occasionally are faced with the difficult esthetic situation of having to remove an anterior tooth because of trauma, advanced periodontal disease, root resorption or failed endodontic therapy (1). Trauma by forceful impaction of primary maxillary anterior teeth is a common occurrence in children during the first 3 years of life (2,3). Incisors are the most frequently affected teeth in primary dentition because of their exposed position in the dental arch (4).

Following traumatic loss of the anterior tooth, it is important that an immediate replacement is provided in order to avoid esthetic, masticatory and phonetic difficulties, and to maintain the edentulous space. Following the loss of anterior teeth in a growing child, although treatment skill is limited, miscellaneous treatment modalities have been attempted in the literature, such as autotransplantation (5-8), orthodontic space closure (9-11), implant treatment (12-15), and the prosthetic rehabilitation (16-19); each having their specific advantages and disadvantages in terms of usage, esthetics and, compatibility with the growing maxilla (20-22).

In such cases, to avoid the problems of esthetics, phonetics, and spacemaintenance, the natural crowns of patients have been used with fixed or removable appliances as temporary prosthetic rehabilitation in a growing child (17,18,23).

In the literature, the use of several fixed or removable appliances after a traumatic tooth loss in the maxillary anterior region and the advantages of using natural crowns on these have been reported, together with the patients' satisfaction (17,18,20,21,23). Furthermore, the utilization of natural crowns instead of acrylic teeth on a fixed or removable appliance is of psychological benefit to the patient and can be better tolerated because of their shape, size, and color (17,18,23,24).

This case report is presented fixed appliance created using natural clinical crown of extracted teeth following trauma. In addition, parents and patients' satisfaction level evaluated using Kupietzky and Waggoner's (25) rating system and the color harmony between fixed appliance created using patient's natural clinical crown and adjacent healthy teeth was evaluated using Cvar and Ryge's (26) modified rating system.

Case Report

A 4-year-old girl with no systemic problem was referred to the pediatric dentistry clinic for treatment of mobility of the maxillary primary central incisors and pain. She had experienced a falling 1 week ago.

Clinical evaluation detected mobility both primary maxillary central incisors, inflamed marginal gingiva and swelling of upper lip (Figure 1). Radiographical evaluation (occlusal radiograph) detected root fracture both primary maxillary central incisors (Figure 2). After clinical and radiographical evaluation, both primary maxillary central incisors were extracted (Figure 3). The crowns of the primary maxillary central incisors were separated from the root, the coronal dentin was reduced to approximately 1 mm from the dentinoenamel junction (Figure 4) and both crowns were stored in sterile saline solution. The patient was

scheduled for impressions 2 weeks later. Meanwhile, the teeth were kept in saline at +4 ˚C until one day before laboratory procedures.

Laboratory procedures were made accordance with Ulusoy and Cehreli's (18) recommendations. In the second appointment, stainless-steel molar bands (Dentaurum, Ispringen, Germany) were adjusted and placed on both primary maxillary second molars, followed by impressions of the maxillary arch with a stock tray and impression material. The molar bands were then appropriately secured into the maxillary impression and a working cast was obtained by using improved dental stone. A 0.9 mm round orthodontic wire (Dentaurum, Germany) was bent to follow the palatal aspects of all maxillary teeth, with an intricate loop bent over the extraction site for acrylic retention.

The distal ends of the wire were soldered to the palatal side of the molar bands. Simultaneously, one operator total-etched the cervical margins and the entire inner surface of the tooth crown with 37% phosphoric acid, followed by rinsing for 15 s. An acetone-based single-bottle adhesive (Prime & Bond NT; Dentsply, Konstanz, Germany) was applied to the etched surfaces. Thereafter, flowable resin composite material (Tetric Flow, Ivoclar Vivadent, Schaan, Liechtenstein) was placed into the crowns in increments and cured for 40 s each. A thin, final increment was placed over the entire cervical margin and photopolymerized. This increment served as an outer layer of resin that could co-polymerize with the denture resin. An autopolymerizing resin (Meliodent; Bayer, Germany) was used to bond the crown over the loop.

Figure 1. View of the traumatized primary maxillary central incisors at first visit.

Figure 2. Occlusal radiograph of the traumatized primary maxillary central incisors.

Figure 3. View of the primary maxillary central incisors after extraction.

Figure 4. Outline of the tooth crowns after reduction of coronal dentin.

Figure 5. View of the fixed appliance before cementation. Inner picture: an intricate loop bent over the extraction site for acrylic retention.

Figure 6. Intraoral view of the fixed appliance after cementation.

Following pressurized polymerization, the appliance was removed from the cast and finished (Figure 5). Following satisfactory try-in and occlusal adjustments, the appliance was cemented in place with glass ionomer cement at the same appointment (Figures 6 and 7). Both the patient and the parents were given hygiene instructions.

Kupietzky and Waggoner's (25) assessment questionnaire was used to find out the satisfaction level of parents and patient's (Table 1). The questionnaire was given to the parents and patients 6 and 12 months after the treatment, and their satisfaction level was evaluated in terms of appearance, color, shape, and size and remaining in the mouth. The scoring system in the evaluation scale was from 1 to 5 (from very unsatisfied at very satisfied). The mean scores for parents and patient satisfaction are given in Table 1. The rating scores from parents and patient's satisfaction for each evaluation criterion ranged from 4 to 5 (satisfied or very satisfied).

The color harmony between fixed appliance created using patient's natural clinical crown and adjacent healthy teeth was evaluated using Cvar and Ryge's (26) modified rating system which has three scores: (i) Alpha: there is no mismatch in color, shade and/or translucency between the restoration and the adjacent

tooth (ii) Bravo: there is a mismatch in color, shade and/or translucency between the restoration and the adjacent tooth, and (iii) Charlie: there is a mismatch between the restoration and the adjacent tooth outside the normal range of tooth color, shade and/or translucency. Color harmony was scored on images that were obtained using a 10.1 mega pixel digital camera (Panasonic Lumix DMC-FZ50; Matsushita Electric Industrial Co, Ltd, Kadoma Osaka, Japan) at illumination of 5000 K ± 10% (Fuji Film Macro Ring Light TT-MED; Fuji Photo Film Co., Ltd., Tokyo, Japan).

Data on color harmony between fixed appliance created using patient's natural clinical crown and adjacent healthy teeth were as follows. Before fixed appliance; color harmony was Charlie scores. At the 6th and 12th months follow-up fixed appliance, color harmonies were Alpha scores.

Table 1. Scale of parents and patient satisfaction

Assessment Criteria	Average for Satisfaction					
	Parents			Patient		
	Before treatment	After treatment		Before treatment	After treatment	
		6 months	12 months		6 months	12 months
Appearance	1	4	5	2	4	5
Color	1	4	5	1	5	5
Shape	1	4	5	2	5	5
Size	1	4	5	2	5	5
Period in the mouth	1	4	5	1	4	5
Average	1	4	5	1.6	4.6	5

1: very unsatisfied; 2: unsatisfied; 3: uncertain; 4: satisfied; 5: very satisfied.

Discussion

Management of the consequences of trauma can be as challenging as the treatment of the traumatic injury itself. Primary or permanent tooth loss requires a combination treatment addressing both esthetics and function. The methodology depends upon the patient's age, and location and extent of traumatic injury (16).

In the present study, space management procedure with esthetic concept was applied. In the literature, the use of several fixed or removable appliances after a traumatic tooth loss in the maxillary anterior region and the advantages of using natural crowns on these have been reported, together with the patients' satisfaction (17,18,20,21,23,24). Furthermore, the utilization of natural crowns instead of acrylic teeth on a fixed appliance is of psychological benefit to the patient and can be better tolerated because of their shape, size, and color (17,18,23,24). Thus in this case, to ensure an esthetic solution for the patient, natural teeth were used instead of acrylic. Unlike other authors in this case report Kupietzky and Waggoner's (25) assessment scale was used to determine the level of parents and patient's satisfaction. At the 6th and 12th month follow-up, the satisfaction mean scores were 4 and 5 for the parents and 4.6 and 5 for the patients, respectively. Both parent and patient satisfaction was affected because of appearance and period in the mouth, but just a little. Their overall satisfaction was approximately very satisfied.

Natural tooth crown can be discolored because of trauma. In the present case, the coronal dentin was reduced and placed of light-shaded flowable resin composite that would provide a better color match for the crown. In addition, color harmony between fixed appliance created using patient's natural clinical crown and adjacent healthy teeth was evaluated using Cvar and Ryge's (26) modified rating system. 12th months follow-up fixed appliance, color harmony was Alpha scores.

Figure 7. Palatal view of the fixed appliance after cementation.

The fixed appliance presented in this case offers a simple and effective treatment option for the extracted tooth, using its own natural clinical crown. It can be considered a hygienic, non-invasive, and long-term provisional treatment without bearing any risk of restricting growth, while providing superior esthetics and function.

This case report presents an alternative treatment option for the premature loss of traumatized maxillary primary central incisors. In addition, parents and patients' satisfaction levels were evaluated. Their overall satisfaction was approximately very satisfied.

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