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Case Report

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Simulating Natural Tooth Anatomy in Anterior Teeth Crown Fracture: A Case Report

Reena Rani[1], Sanjay Chachra[2], Manu Sharma[3], Samriti Bansal[4], Taranjot Kaur[4], Diksha Sharma[1]

1 *Post Graduate Student, Department of Pedodontics and Preventive Dentistry,Swami Devi Dyal Hospital and Dental College, Barwala, Haryana, India*

2 *Professor and Head, Department of Pedodontics and Preventive Dentistry, Swami Devi Dyal Hospital and Dental College, Barwala, Haryana, India*

3 *Senior Lecturer, Department of Pedodontics and Preventive Dentistry, Swami Devi Dyal Hospital and Dental College, Barwala, Haryana, India*

4 *Professor, Department of Pedodontics and Preventive Dentistry, Swami Devi Dyal Hospital and Dental College, Barwala, Haryana, India*

Abstract

Background: Trauma to the anterior teeth is common in young children and in adolescents. Uncomplicated crown fracture to the permanent teeth has an intense effect not only on the patient's esthetics, but also on speech and function. **Aim**: Performing an economical, a minimally invasive, time-saving, long lasting, functional and natural alike direct composite resin restorations in a single visit. **Conclusion**: As restoring a fractured tooth structure is a complex procedure, this technique can prove to be a simple, effective and appropriate technique that will fulfill all the requirements of dental practioner without requiring special skills in providing the patients with direct composite restorations. **Clinical Significance:** This technique is economical which requires less chair side time compared to indirect restorations.

Keywords: Anterior teeth, Direct composite restoration, Young children.

INTRODUCTION

Anterior crown fractures are most common form of injury that mainly affects children and adolescents. Uncomplicated crown fracture to the permanent teeth has an intense effect not only on the patient's esthetics, but also on speech and function [1].

Excessive loss of dental hard tissues create difficulties for the esthetic outcome of subsequent prosthetic restorations [2]. The predictable esthetic restoration of broken incisal edge of maxillary central incisors is a demanding and technique sensitive procedure. Its success is depending upon operator's skills and knowledge and also on adhering to a systematic and problem-solving approach. A logical method is used to build up morphologically correct composite restorations for which direct composite resin restorations have become a viable alternative for patients that require anterior restorative procedures to be integrated to the other teeth that compose the smile, especially for presenting satisfactory esthetic results and minimum wear of the tooth structure [3].

CASE REPORT

A 12-year-old girl reported to the Department of Pedodontics and Preventive Dentistry for the treatment of fractured upper front teeth with esthetic concern. Patient gave history of trauma 3 months back due to fall from a bicycle. Clinical examination revealed Ellis class II (uncomplicated) fracture in relation to 11, 21 and 22 (figure 1).

Figure 1: Ellis class II (uncomplicated) fracture in relation to 11, 21 and 22

***Corresponding author:**
Reena Rani
Post Graduate Student, Department of Pedodontics and Preventive Dentistry,Swami Devi Dyal Hospital and Dental College, Barwala, Haryana, India
Email:
reenachouhan521[at]gmail.com

Intraoral periapical radiograph confirmed the absence of pulpal or periapical pathosis. Therefore, a direct composite restoration technique was planned for restoration of the fractured segment.

The unsupported enamel was removed giving 45 degree bevel. Preliminary impressions of both the arches were made using alginate, study models were made in dental stone and mock preparation on the cast of the lost tooth structure was done using carving wax blocks(figure 2a) enabling the preparation to be easily polished without any extra efforts. After crown build up, the cast was duplicated by using template of putty impression material. (figure 2b) Labial surface of the putty template was sectioned up to middle third of the crown, to be used later in the mouth to aid in the finishing of labial surface as that of mock preparation of the lost tooth structure.(figure 2c,d)

A clinical try-in of the template was done to ensure adequate fit (figure 3a). After appropriate shade selection of the composite material, the translucent shade of flowable composite resin (Filtek Z 350, 3M-ESPE, USA) (figure 3b) was used to construct the palatal enamel wall with the aid of the template and polymerized for 40 seconds. Labial surface was restored by using restorative composite resin (Filtek Z 350, 3M-ESPE, USA) and sectioned labial section of template was placed onto the labial surface of fractured crown to create the surface enamel layer and the build up was done to restore the fractured teeth quickly with minimal post-restoration finishing. (figure 3c)

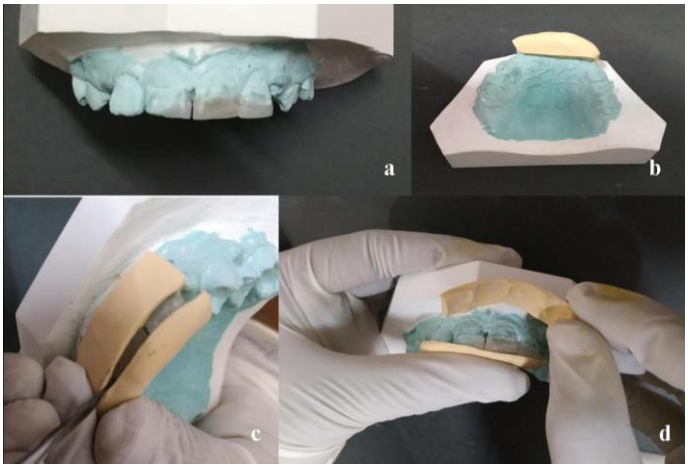

Figure 2: (2a) Mock wax preparation on cast model,(2b) Impression taken with putty material,(2c)Sectioning of putty impression into two halves and (2d) Sectioned labial surface of putty impression

Figure 3: 3(a) Intra oral view with putty template,(3b) Palatal wall construction and (3c) Post-operative view

DISCUSSION

Fracture of front teeth is a tragic experience for any individual, thereby reducing the confidence and performance of a person in their activities. It is for the clinician to esthetically and economically restore a fractured tooth keeping in mind patients systemic and local conditions [4].

Ideally, reattachment of fractured tooth fragment, if available, gives the best esthetic results. However, the longevity of such reattachment procedure is questionable because of its tendency to fracture/debond. Indirect restoration of such fractures results in greater risk of biological and mechanical failure due to extensive tooth preparation [5].

Singhal R found 24-51% variations in reattached tooth with resistance in relation to intact tooth structure. Greater risk of biological and mechanical failure due to extensive tooth preparation occurs in fxed prosthesis [5]. Whereas Hemmings *et al*., gave a success rate of 90% with a mean follow up period of 30 months for direct resin composites placed at maxillary anterior teeth [6].

Considering the age of the patient in the present case where the fractured tooth is in its active eruption phase, an esthetic direct composite restoration was planned. Various techniques were considered to restore the tooth with composite restoration which included direct technique (free hand composite restorations; indirect technique; usage of preformed crowns/ thermoplastic moulds as templates but there are certain drawbacks like requirement of specialized instruments like vacuum former, availability, time consuming and most importantly proper incremental layering of the composite material is not possible. Thus in the present case a novel method which includes both direct and indirect method of restoring was designed by using Polyvinyl Siloxane (PVS) Rubber base impression material (putty) as template. This method is simple, quick and economic when compared to other invasive procedures. The usage of the PVS template allowed incremental layering of the composite material; optimal depth of cure; accurate reproducibility of the anatomic contours and minimal polishing and finishing procedures [4].

CONCLUSION

Restoring fractured anterior teeth is a complex and time consuming procedure. The technique used in this case report can be novel, as the template aids in an economical esthetic rehabilitation. It provides operator's control over the composite material, thereby saving the chair side time and providing better esthetics.

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