International Journal of Dentistry and Oral Science (IJDOS)
ISSN: 2377-8075

Restoration Of Anterior Teeth Using Putty Index - A Case Report Series

Case Report

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Abstract

Background: In the world we live in, majority of the dental treatments which are performed are done with aesthetics as the major concern to be addressed. Majority of the children these days report with fractured teeth due to trauma. Such teeth usually undergo endodontic treatment followed by which a crown is placed due to involvement of the pulp. But in a small fraction of cases, there is no pulpal involvement. In such cases, restoration of the tooth is rather difficult. It is equally important to ensure that such restorations restore not only function but also the aesthetic requirements.
Conclusion: Restoration of guiding palatal surfaces using direct techniques is difficult, but can be simplified by using a template.The template technique requires no special equipment hence making it economical.

Keywords: Aesthetics; Pediatric Dentistry; Restoration; Trauma.

Introduction

With the passing time dentistry has seen a turnover from the concern been shifted from good oral health to establishment of oral health with emphasis on esthetic. The modern world is aware and concern about esthetic and appearance of a patient's teeth is an important psychological factor influencing his/her attractiveness and self-confidence. Most common reason for breach in esthetic of young children and adolescent is trauma. Statistic shows uncomplicated and complicated crown fracture is the commonest dental injury and the maxillary incisor is affected in maximum cases. The count goes as follow, maxillary incisors share 96% of all the crown fractures (80% central incisor and 16% lateral incisor).[1] Reason for the pattern is the awkward position of the teeth i.e., in the most anterior region as well as it's their relative eruptive pattern resulting in its protrusion.[2] A fractured tooth in the most esthetically important region not only has an intense effect not only on the patient's appearance, but also on function and speech.[3]

The fate of such injured teeth is endodontic treatment but restoration part is a common problem in restorative dentistry.[4] Previously restoration with acrylic resins or complex ceramic restorations associated with metals were used. However the limitations of these options were inadequate long term esthetics, requirement of significant tooth reduction and long appointment needed for it.[5]

An era started where dentists worldwide started using directly placed resin-bonded composite to restore damaged anterior teeth. While such techniques are more conservative to tooth tissue, operative techniques using direct composite is technique sensitive and stand out as a challenge. Clinicians require both technical and artistic skill to fulfil the need of the restoration being functionally and aesthetically acceptable.Many practitioners point out that this method apart being time consuming, do not offer predictable result in terms of aesthetics. Mainly restoring guiding palatal surfaces is a tough task.[6]

Here we present a method through which these problem can be overcome. This novel technique consist of simple technique of using a template constructed from a prototype restoration or a

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Received: April 07, 2021
Accepted: September 20, 2021
Published: September 21, 2021

Citation: Nadhirah Faiz, Mebin Mathew George. Restoration Of Anterior Teeth Using Putty Index - A Case Report Series. *Int J Dentistry Oral Sci.* 2021;8(9):4399-4402. doi: doi: http://dx.doi.org/10.19070/2377-8075-21000895

preoperative wax-up.

Case Report

Case 1

A 9 year old girl visited Department of Pedodontics, College Of Dental Sciences with an esthetic concern for her fractured upper front teeth. Patient gave a history of trauma 2 month back while she was engaged in some sports activity. On examination 11 and 21 had an Ellis class II fracture with 11 and 21. The tooth was asymptomatic with negative finding with surrounding soft or hard tissues. Next pulp vitality was tested using Heat Test, which showed positive response. To confirm the finding an intraoral periapical radiograph was taken which again showed absence of any pathology which meant the pulp was healthy and needed no treatment and concentration was shifted to restored fractured part of both the teeth.

Case 2

A 13 year old girl complained of fractured teeth in upper front region and wished for restoration with the same. She gave a history of tripping and falling which lead to the injury about 1 month ago. Intraoral examination revealed Ellis class II fracture with 11. Tooth was asymptomatic and reacted normally to Heat Test done to check the vitality of pulp. Intraoral periapical radiograph also showed normal finding, thus redirecting the treatment plan toward restoration of fractured tooth.

Case 3

After getting traumatized 14 year old boy visited Department of Pedodontics after 3 days. While playing, the boy got hit by some wooden stick which gave rise to the trauma to the upper front teeth. Extraoral examination was done which gave no significant findings. Intraoral examination showed an asymptomatic uncomplicated crown fracture with 11. Intra oral radiograph showed normal periapical structure as well as a fracture line close to but not involving pulp. Vitality test was done which showed normal response. Waiting period of 2 weeks was kept for tooth to recover for the state of shock and vitality test was again repeated after 3, 7 and 15 days, however the response was normal. Thus, the treatment plan formulated included the application of dycal followed by esthetic composite build up.

For all these cases a common, a novel method for restoring the uncomplicated fractured maxillary anterior teeth was applied.

The first step was to create a 45°bevel to remove the unsupported enamel and increase the surface area. Preliminary impression of the upper and lower arches were made using fast setting alginate (Algitex; DPI, Mumbai, India) and dental stone study models were made. On these stone models, mock preparation of the lost

Figure 1. Intraoral Frontal View.

Figure 2. Intraoral maxilla occlusal view.

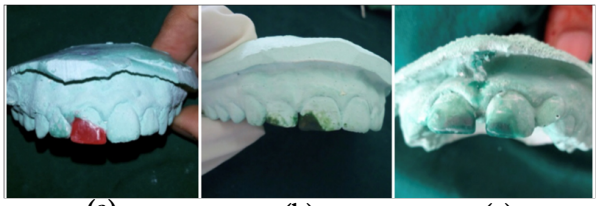
Figure 3. Intraoral Frontal View.

Figure 4. Intraoral Maxilla Occlusal View.

Figure 5. Intraoral Frontal View.

Figure 6. Intraoral maxilla occlusal view.

Figure 7 (a,b,c). Wax build up on the model.



(a) (b) (c)

Figure 8. Fit check of the template prior to the restoration.

tooth structure was done using modelling wax. Using the cast of lower arch occlusal interference was checked.

After crown build up and conformation of normal occlusion, the cast was duplicated by using Polyvinyl siloxane putty impression material (AFFINIS, COLTÈNE ADHESIVE AC) just before starting the procedure. Labial surface of the putty template was removed up to middle third of the crown, leaving behind the palatal surface and incisal edge.

Before starting with restoration a clinical try-in of the template was done to ensure adequate fit of the template in patient mouth.

This was followed by shade selection before dehydration of the teeth, under natural light.

ETCH AND ADHESIVE: Before etching, cavities must be thoroughly washed, dried and inspected for any debris. Next as with any normal composite restoration the teeth is etched and bonding agent was applied. Etchant is applied to the entire cavity and just beyond the margins. Excessive etchant should not extend beyond this area, to prevent excess composite adhering and being difficult to remove without iatrogenic damage to underlying enamel. The enamel surface was etched for 15 sec followed by application of bonding agent which was cured for 30 sec.

LOADING THE TEMPLATE: The template was majorly used to build the lingual and the incisal surfaces of the teeth. Care was taken about how much composite is been loaded because excessive material may result in bonding of the teeth to each other and too little material results in gaps. Proximal area were cautiously shaped so the proximals were separated.

SEAT THE TEMPLATE: The template was fully seated, and any excess was sculpted away, with care to maintain a slight gap between teeth proximally.

LIGHT CURE AND REMOVE THE TEMPLATE: Curing from the facial was performed for a long enough time to set the composite on the lingual. The template is removed carefully, and the lingual surface was checked for any uncured composite. The palatal shell immediately establishes the three dimensional form of the whole restoration.

FULLY FORM EACH TOOTH: Addition of was done then on the facial and proximal surfaces.To avoid polymerization shrinkage incremental buildup was followed.

CONTOUR: Once the basic tooth form was achieved, contouring was done. The adjustment tooth was used as a reference for this.Final curing of extra 60 seconds is done before polishing

FINISHING AND POLISHING: Fine finishing and polishing was carried out in the next appointment when the operator's eyes and attention were fresh to look into minute changes. Polishing cups embedded with polishing agents were used for this purpose.

Discussion

A fractured of tooth in the front region is a tragic experience for young patient creating a psychological impact on both the parents and in children. Such patients become a target for their fellow mates and peers to tease, ridicule and reduce their self esteem.[7, 8] Restoring this lost tooth form present as a challenge to dentist as the tooth is to be reformed both functionally and esthetically. Various treatment modalities for such cases are available, for instance, composite restoration, fixed prosthesis, re-attachment of the fracture fragment (if available) followed by post and core and laminated veneers or full-coverage restoration supported restorations.[7, 9, 10] Choice of treatment depends on the age, socioeconomic status of the patient and intraoral status at the time of treatment planning [3].

However, all these option have certain limitations. Fixed prosthesis needs the sacrifice of the healthy tooth structure leading to greater risk of mechanical or biological failure. Such restorations are expected to match with the adjacent un-restored teeth, which is not easy to achieve.[3] Other option was to reattach the broken fragment of the tooth; however none of the patients had the broken piece of their tooth.

Considering the age of the patients in the present cases where the fractured tooth is in its active eruption phase, an esthetic direct composite restoration was planned. Composite restorative material was the material of choice to replace the fractured structures because of its esthetics and high sustainability and it does not require any extensive tooth preparation protecting the already weakened teeth.[7] For the composite restorations, various techniques were considered like direct technique (free hand composite restorations; usage of preformed crowns/thermoplastic moulds as templates).

Preformed crowns or thermoformed template give good results but its use requires specialized instruments like vacuum former, and due to its unavailability, time consuming nature and most importantly, the proper incremental layering of the composite material is not possible as in this template method.[3] Therefore, a novel method of using polyvinyl siloxane (pvs) rubberbase impression material (putty) as template which includes both direct and indirect method of restoring was designed. The advantages of this technique are it is simple and quick when compared to other invasive procedures. Use of template allows the incremental layering of the composite material which in turn has its advantages of less shrinkage and optimal depth of cure. This helps to reproduce of the anatomic contours perfectly thus reducing polishing and finishing procedures and saving time.[3] On the other hand, the conventional 'free hand technique' needs long chair side time to restore a single tooth and each restored tooth needing more trimming and polishing.[7] Restoration of guiding palatal surfaces using direct techniques is difficult, but can be simplified by using a template.[3] The template technique requires no special equipment hence making it economical.

Aesthetic dental practitioners have to familiarise themselves with more techniques which can provide more accurate results while taking less chairside time with the patient. One such technique that can be considered is the technique of using a putty index to restore anterior teeth. Although it takes a slightly longer time to provide results, it surely yields better esthetics than the free hand composite buildup technique and doesn't result in practitioners fatigue due to increased chairside time. When free hand technique and index technique are compared, in the long run, the outcome seen in the putty index restoration will be much better as the esthetic and functional component of the restoration are checked well on the model before the index is made and the tooth is restored. In conclusion, it is important for dentists to be aware of the current trends, its pros and cons and utilise these practices to enhance their practice and provide utmost patient satisfaction.

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