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Fibre Reinforced Composite for Restoring Traumatized Anterior Tooth - A Case Report

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Abstract:
The loss of anterior tooth structure affects patient's esthetics and hampers his psychological and social well being[4]. The reconstruction of structurally compromised anterior teeth is rather a challenging procedure for a Dentist[3]. A conventional build up technique using composite resin restoration alone can fulfill the esthetic requirement, but the strength is still compromised. This has drawn the attention of the researchers to design a biomimetic material which can replace dentin and reconstruct the tooth to its utmost natural appearance and strength[3]. The following case report presents a technique of reinforcing a traumatized vital anterior tooth (representing Ellis Class II fracture) with a fibre reinforced composite resin.

Keywords: *Biomimetic material, traumatized vital anterior tooth, fibre reinforced composite resin.*

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I. Introduction

Traumatic dental injuries are the most disruptive and distressing emergencies in dental practice. Fractures of coronal portion of anteriors are more common form of dental trauma that mainly affects children and adolescents. Coronal fractures of permanent incisors account for 18-22% of all dental traumas, among which 96% involve maxillary central incisors.

Several factors influence the management of coronal tooth fractures. Therefore, it becomes important for dental professionals to restore and reconstruct the tooth by establishment of esthetic, maintaining the function and preserving the integrity of the dental arch. Overtime, numerous techniques have been developed for reconstruction of fractured teeth. The case presented in this article represents one of the recently advanced technique in the management of anterior tooth fracture.

Fibre reinforced composites were first described by Smith in 1960[2].The successful restoration of traumatized anterior tooth requires reconstruction of proper anatomical form, rehabilitation of function by achieving good strength and acceptable esthetics. This biomimetic material mainly protects the teeth against fracture, improves the flexural strength and also reduces microleakage of composites[3]. Glass fibre reinforcement of composite resins is the most common reinforcement technique used in dental practice[1]. Carbon/graphite, boron, ceramic, aramid and metal fibres can also be used[1]. The fibre reinforcement can be of long fibres (core contains more number of fibres) or can be of short fibres. The case represented in this article represents a novel technique in restoring an uncomplicated fractured maxillary anterior tooth (Ellis Class II fracture) with fibre reinforced composite which is quite economical and a single visit chairside procedure[6].

II. Case Report

A 20 year old male patient reported to the Department of Conservative Dentistry and Endodontics in the Government Dental College and Hospital, Aurangabad with a chief complaint of fractured upper right front tooth and wanted to reconstruct the fractured portion for esthetic concern. Patient gave history of trauma 6 years back due to fall from a bicycle. Clinical examination revealed Ellis Class II (uncomplicated) fracture to 11. The tooth was asymptomatic without any associated injury to the surrounding hard or soft tissue and responded to

electric pulp test. Intraoral periapical radiograph showed non- involvement of pulp and confirmed the absence of periapical pathosis. The remaining tooth structure was quite compromised for restoring with conventional composite resin restoration alone. So it was decided to use fibre reinforced restoration technique i.e. placement of interlig fibres followed by composite resin restoration.

Figure 1, 2 and 3 shows pre operative photographs

FRONT VIEW SIDE VIEW PALATAL VIEW

Figure 1

Figure 2

Figure 3

III. Treatment Plan

A 45 degree bevel was placed labially to remove the unsupported enamel and increase the surface area using round ended tapered carbide bur. This was followed by placement of two grooves palatally using No. 245 straight fissure carbide bur (figure 4 and 5). The grooves placed mesially and distally followed the mesial and distal line angles. Also the grooves were placed parallel to the long axis of the tooth so as to resist the forces well.

PALATAL VIEW SHOWING PLACEMENT OF TWO PALATALLY PLACED GROOVES

Figure 4

Figure 5

DIMENSIONS OF PALATALLY PLACED GROOVES : (2×1×0.8) mm i.e., length × breadth × depth

Proper shade selection using VITA shade guide was done. This was followed by etching with 37% phosphoric acid for 20 seconds (figure 6) and bonding with nano technology dental adhesive both available in Dentsply (SPECTRUM) kit.

ETCHING OF PALATAL SURFACE

Figure 6

This was followed by placement of interlig fibres of length 4mm within the two palatally placed grooves (figure 7, 8 and 9).

PLACEMENT OF INTERLIG FIBRES LABIALLY AND PALATALLY

Figure 7

Figure 8

Figure 9

Finally, the tooth was restored with Dentsply (SPECTRUM) universal microhybrid composite kit (figure 10).

Figure 10

After proper alignment and contouring, finishing and polishing procedure was completed. Figure 11 and 12 shows finally restored and polished maxillary right central incisor.

POST OPERATIVE PHOTOGRAPHS

Figure 11

Figure 12

Figure 13 and 14 shows pre operative and post operative comparisons.

PRE OPERATIVE PHOTOGRAPH

Figure 13

POST OPERATIVE PHOTOGRAPH

Figure 14

IV. Discussion

The loss of anterior tooth structure requires immediate attention to restore its form, function and esthetics[1]. Fibre reinforced composite restoration is more advanced, better and excellent choice to treat uncomplicated or even complicated type of fractures. In present case, considering age, esthetic requirement and longevity of restoration, fibre reinforcement was planned, which not only increases the strength but also the span of restoration.

V. Conclusion

As restoring a fractured tooth is a complex procedure and in utmost cases strength is a compromising factor, restoration with interlig fibres provides greater strength, gives excellent esthetics and also increases the life of the restoration[6].

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