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Anterior fractured tooth restoration using fiber-reinforced composite: A case report

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ABSTRACT

Anterior teeth fracture is one of the most common type of complaints in dental office. It affects not only function and speech of patient but also the emotional and psychological wellbeing of patient due to aesthetic concerns. The reconstruction of structurally compromised anterior tooth is of great challenge to dentists. Conventional composite restoration is choice of restoration in such cases, but strength is an issue . To provide longevity and strength to restorations fibre reinforced composites can be used in such cases . In the present article aesthetic rehabilitation of anterior fractured tooth using fibre reinforced composites is presented.

Keywords: *Fibre Reinforced Composite , Fractured anterior teeth , Esthetics.*

1. INTRODUCTION

Dental trauma has physical and psychological effects on patient by influencing both dental functions and appearance[1]. Crown fractures have been documented to account for up to 92% of all traumatic injuries to the permanent dentition. In which 96% involve maxillary central incisors[9]. Traumatized anterior teeth require quick functional and aesthetic repair[2]. The conventional composite restoration is used for rehabilitation of these cases , but has some limitations in compromised tooth fractures like extensive angle fractures.

Fibre-reinforced composites (FRCs) were first described in the 1960s by Smith[7]. Fibre-reinforced composite restorations are resin-based restorations containing fibres aimed at enhancing their physical properties[7]. The use of adhesive material to reinforce weakened teeth, and undermined enamel was first given by Denehy and Torney in 1976. Fibre reinforced composites consist of fibre material held together by a resinous matrix. They offer good flexure strength and replacement of lost tooth structure[3]. The fibre reinforcement can be of long fibres or can be of short fibres[9].

Currently, the interest for using FRCs is rapidly growing and its use to reinforce long-term restorations have an acceptable success rate[1]. Fibre reinforced composite (FRC), designed to replace dentin, enables the biomimetic esthetic restoration of anterior teeth[8].So can be used as a choice in anterior teeth fracture cases. The case presented in this article represents one of the recently advanced technique in the management of anterior tooth fracture.

2. CASE REPORT

A 28-year-old patient with chief complaint of fractured upper front tooth reported to the department of Conservative dentistry and endodontics and desired to get the tooth restored. Patient gave history of trauma 1 month back due to fall from bike . On clinical examination uncomplicated crown fracture was seen with 21(Ellis class 2 fracture) involving enamel and dentin part. Patient gave history of slight hypersensitivity with same tooth on consumption of cold water and cold drinks.

Surrounding hard and soft tissues were normal. Patient did not have pain ; teeth were non tender on percussion. Electric pulp testing of fractured tooth (21) and adjacent tooth(11) gave normal response. Patient gave history of composite restoration 15 days back in private clinic. Which was dislodged in 3 days after placement. Restoration was again repeated with same consequence so patient visited our department. Based on these factors fibre reinforced composite restoration was planned for strength , longevity and esthetic concerns.

3. TREATMENT PROCEDURE

Oral prophylaxis was done then preoperative photographs were taken . The area to be restored was dried; then primary and secondary bevels were given on the respective tooth ; followed by placement of 1 groove palatally using No 245 straight fissure carbide bur. The groove was placed only distally as mesially there was enough natural tooth structure present. The groove was placed parallel to long axis of tooth so as to resist the forces .Dimensions of groove were – (2×1×0.8) mm that is Length× breadth× depth.

After air drying the tooth; etchant (37% phosphoric acid) is applied for 15 seconds. Then the etchant is removed using water spray and again dried and isolated . Then bonding agent is applied and then cured for 20 seconds. This was followed by placement of interlig fibres of length 4mm within the palatally placed groove, and light cured. Then the tooth was restored with composite resin restoration. After proper alignment and contouring, finishing and polishing procedure was completed.

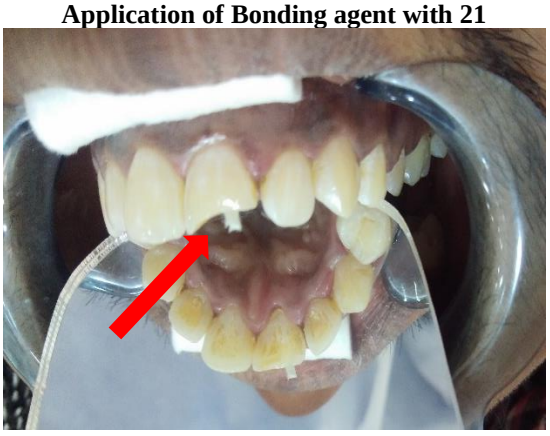
Preoperative clinical photograph with 21

Placement of palatal groove on distal side

Acid etching with 37% Phosphoric Acid

Application of Bonding agent with 21

Interlig Composite fibres

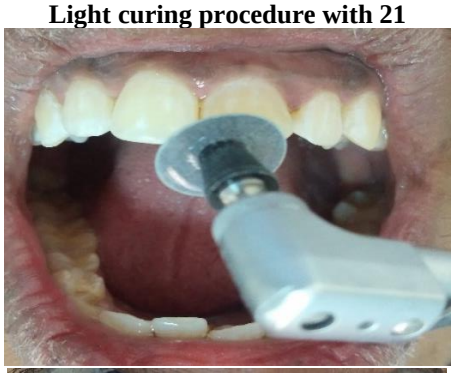


Placement of Fibres (4mm length) in palatal groove of 21

Application of composite resin with 21

Light curing procedure with 21

Finishing with composite finishing bur



Final polishing with rubber disk

Preoperative and Postoperative appearance of with 21

4. DISCUSSION

crown fractures in anterior teeth are 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 appearance, but also on function and speech. Management of patient's with anterior compromised tooth fracture provides great challenge to the clinicians. The increasing demand for aesthetics, especially in anterior teeth, suggests that restorative needs and reasons for restoration failure other than caries and fracture might occur in a large extent in anterior restorations[5] so a strong restoration should be provided.

Fibre reinforced composite are now newly available for various treatment modalities. Besides improving the strength of the restoration, the incorporation of glass fibres into composite resins leads to favourable fracture patterns because the fibre layer acts as a stress breaker and stops crack propagation. Fibre reinforced composite material that provides fracture toughness greater than dentin and almost double that of conventional composites. The mechanical advantages provided by Fibre reinforced composites are their flexural strength, fatigue strength, elastic modulus, and bond strength[8]. Glass fibre reinforcement of composite resins is the most common reinforcement technique used in dental practice. Carbon/graphite, boron, ceramic, aramid and metal fibres can also be used[4].

Interlig is a structure of intertwined glass fibers impregnated with light-cured composite resin. COMPOSITION - Glass fibers (weight) - 60 ± 5%. - Impregnated resin (weight) 40 ± 5%: Bis-GMA, diurethane, barium glass, silicon dioxide, catalysts[6]. Fibre reinforced composite can also be used in case of splinting, reinforcement and repair of acrylic resin bridges, fabrication of space retainers in pediatric dentistry[6].

Fibres reinforced composite are noncorrosive, have good bonding, prevents crack propagation in a restored teeth[3], easy to use and can be performed in single visit. Due to its advantages like strength, support, longevity, esthetic etc is can be used as a material of choice for anterior fracture teeth restoration.

5. CONCLUSION

As restoration of compromised anterior tooth fracture requires support for binding; fibre reinforced composites provide sufficient strength , support and long life to the restoration. So in cases of fractured tooth with less tooth support (compromised) Interlig fibres can be a choice for composite restorations.

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