CASE REPORT

FIBER POST USED FOR REATTACHMENT OF FRACTURED TOOTH FRAGMENT: A CASE REPORT

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ABSTRACT

Coronal fractures of the anterior teeth are a common form of dental trauma that mainly affects children and adolescents. In recent past conservative and aesthetic reattachment of the fractured teeth has gained popularity. It also restores function, provides a positive psychological response, and is a relatively simple procedure. In this case presented below is a case of Ellis class III horizontal fracture in respect to 11. In order to do conservative treatment a combination of external enamel bevel and internal dentinal groove has been used to enhance the bonding between the fractured fragment and the remaining tooth. The treatment was found to be successful both functionally and aesthetically at the 12-month follow-up.

KEYWORDS: Trauma, tooth fragments, conservative re-attachment, fiber post.

INTRODUCTION

Fracture of the crown of anterior teeth are a common form of dental trauma that mainly affects children[1, 2]. maxillary central incisors are most commonly effected teeth in dental trauma mostly Ellis III class type of fractures[3, 4, 5]. As there is an aesthetic concern in the anterior teeth immediate treatment is requried, if untreated, it will lead to psychological impact on the patient can cause damage to dentition[3]. Ellis III fracture management is a multifactorial process which includes violation of biological width, conservative and endodontic involvement, alveolar bone fracture, restorability of fractured tooth, soft tissue injuries, availability of fractured tooth fragment and in which condition it is present for use to get the fit between fragment and the remaining tooth structure, occlusion, esthetics, finances, and prognosis[6]. A systemic way is taken for the treatment of fractures of anterior teeth for the successful treatment out-come of the restorative approach. One of the options for managing coronal tooth fractures, especially when there is no or minimal violation of the biological width, is the reattachment of the dental fragment when it is available[7].

CASE REPORT

A 27-year-old male injured in a road traffic accident (RTA) was referred to the Department of Conservative Dentistry and Endodontics Farooqia Dental College and Hospital. Examination (clinical and radiographic) revealed an Ellis III type of fracture in respect to 11 a horizontal fracture in the cervical third of the crown portion of the tooth. The fractured segment was not lost during trauma and was adhered to the tooth. There was also Ellis class II fracture of 21 was also noted but the fractured segment was missing ((Figure1(a)). Periapical radiographs revealed an intact periodontal ligament space, complete root formation, no periapical radiolucency and no root fracture in relation to both teeth. Noncontributory medical history. Patient was informed about the treatment procedure its merits and demerits along with other treatment options. Treatment was planned to be performed in single visit root canal treatment (RCT) on 11 followed by reattachment with fiber post reinforcement. 21 was also planned for composite restoration.

Figure1(a)

Figure1(b)

Figure1(c)

Figure1(d)

Figure1(e)

Figure1(f)

Figure1(g)

Administered of local anesthesia was done (lidocaine 2% with 1: 80,000 epinephrine) in relation to 11. Fractured segment was a-traumatically removed. The fractured segment was then cleaned with normal saline and then dipped in 2% chlorhexidine solution and stored in isotonic saline solution. A barbed broach was used to extirpation the pulp. The opening of the root canal was sealed with a cavit-G plug. 37% phosphoric acid gel was used to etch enamel, dentin and pulp chamber rinsed, and coated with an ethanol-based adhesive system (Prime and Bond Active Densply Sirona) and at this point the adhesive was not light cured. A "pick-and-stick" was used to secure the coronal tooth fragment in order to facilitate handling of the fractured segment. The fractured surface of the fragment was treated with 37% phosphoric acid gel for 30 seconds followed by rinsing. The etched surface was then coated with adhesive system. Composite resin (THP Spectra Universal Composite Densply Sirona) was applied to both fragment and tooth surfaces. Special attention was paid to accurately fit the fractured segments. Excess resin was removed after the original position was re-established, light-curing was done for 40 seconds on each surface, before the polymerisation no displacement between the fragments was checked. The margins were properly finished with diamond burs and polished with a series of composite finishing set (Kerr) and diamond polishing paste.

RCT was performed on 11(Figure 1(d)) shows the selection of master cone and RCT was completed post space was prepared using GG drills and Peeso reamers (Figure(e)). Esthetic fiber post was selected (Figure(f)). The prepared post space was etched for 15 seconds using 37% phosphoric acid. It was then rinsed thoroughly with water and excess water was removed with a cotton pellet. Next the adhesive (Prime & Bond NT, Nanotechnology Dental adhesive, Dentsply, St. Paul, MN, USA) was applied on the etched surface as well as the post. The adhesive was air thinned and light-cured for 10 seconds. The post was then luted with resin cement (Multilink, Ivoclar, Vivadent) with 2mm of its coronal portion extending into the chamber. The composite restoration for 21 was performed. The patient was advised for post-operative care of the restoration he was asked not to bite on hard food and not to consume highly colored food he was kept on periodic recall and review. Both endodontic and restorative treatments were observed which remained clinically acceptable through each visit. The clinical and radiographic pictures after 1 year revealed favorable healing (Figures 1(g) and 1(b)).

DISCUSSION

For the rehabilitation of the patient this treatment procedure performed and presented in this clinical case report is one of the many possible options that can used. The other treatment options may have included the endodontic therapy followed by restoration of the tooth with composite resin or with a full coverage crown. Selection of the treatment plan has to be done according to the wishes and desires of the patient and considering the advantages and disadvantages of each technique available[8].

Treatment for restoring fractured anterior teeth with composite resin and acid etch technique is considered to be a highly aesthetic. As composite resin possess translucency, opacity, opalescence, iridescence, fluorescence and surface gloss which are the secondary optical properties of it. Composite resins of newer formulations are highly esthetic however, no synthetic restorative material that can replicate the aesthetic characterization or color stability of the natural tooth structure[9].

Teeth opposing to the are not abraded as composite resin will be abraded more quickly than enamel of the by the opposing teeth[10]. In a re-attached tooth, the opposing tooth is abraded at the same rate as the natural tooth remains intact. In addition, the treatment procedure is less time-consuming as it is performed in single visit compared to full crown preparation which has to be done in multiple visits which makes it a cost-effective procedure and affordable for the patient[11].

As the original tooth fragment is reattached it gives an emotionally and socially positive response due to the protection of the natural tooth structure. The patient and parents are at least satisfied of the original fragment being used in the restoration of their fractured tooth[12].

It has been recommended by various authors that the preparation of tooth fragments and making grooves in them enhance the bonding of the fractured fragment to the remaining tooth[13, 11, 14]. Many authors have also stated that when reattaching without making any extra preparation for the broken incisal part and for the remaining tooth in the mouth, lower values than intact tooth fracture strength were obtained. Hence, they concluded that there is a necessity of the application of an extra preparation on the tooth when reattaching the fractured fragments. In the case presented here, a combination of external enamel groove (bevel) in the shape of a V at the fracture interface and an internal dentinal grove has been used to enhance the bonding of the fragment with the remaining tooth. The patient was followed-up for 12 months and the results were found to be satisfactory, both aesthetically and functionally. Bruke[15] had also used a combination of an internal dentin groove and the circumferential beveling of enamel margins and found the result to be successful. Other additional preparations that have been used by different clinicians to improve adhesion between the fractured and the remaining segment include placing a chamfer at the fracture line after bonding[12, 16], using a V-shaped enamel notch[17] and placing an internal groove[10, 18] or a superficial over contour over the fracture line[19].

According to Andreasen et al. fabrication of a mouth guard and patient education about the precautions and treatment limitations of this procedure. In young patients and adolescents, where a prosthetic rehabilitation or an implant is indicated but is limited by their age, reattachment may be carried out as a provisional restoration or treatment. Some patients cannot afford these complex treatment procedures. In those cases, if the patient could benefit from the restoration for some years before receiving a more complex – and expensive – prosthetic solution, our objective will have been achieved[8].

CONCLUSION

This case report concluded that the reattachment of the fragments is a faster, easier, and cost-effective treatment procedure and high strength can be achieved by performing a combination technique of preparing the fragments, using bonding agents and strengthening with fiber post.

ETHICAL ISSUES

It is not applicable.

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