

Adhesive reattachment of a tooth fragment: The biological restoration

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Abstract

In young patients uncomplicated crown fractures are frequent dental injuries. The immediate fragment reattachment is the choice of treatment for uncomplicated anterior crown fracture as it is a very conservative treatment, rehabilitates function and aesthetics in a short time by preserving dental tissues. The aim of this article is to present a case report and explain the clinical procedures for the immediate fragment reattachment.

Keywords: Trauma, Fracture, Conservative, Reattachment.

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I. Introduction

A trauma with accompanying fracture of anterior teeth is a tragic experience for the young patient who requires immediate attention, not only because of damage to the dentition but also because of psychological effect of the trauma to the child and his parents. [1]A number of techniques have been developed to restore the fractured crown. Early techniques include stainless steel crowns, basket crowns, orthodontic bands, pin retained resin, porcelain bonded crown and composite resi.[1,2]

Tennery was the first to report the re-attachment of a fractured fragment using acid-etch technique.[2] Subsequently, Starkey and Simonsen have reported similar cases.[3,4]The introduction of composite in combination with the use of acid-etch technique to bond composite to enamel, made restoration possible for the fractured incisor, with little or no additional tooth preparation[5,6],. However, composite resin have the disadvantage of poor abrasion resistance in comparison to enamel.[7,8]. Reattachment of fragment may offer following advantages ;

1. Better aesthetics, as shade match and translucency will be perfect.[9]
2. Incisal edge will wear at a rate similar to that of the adjacent teeth.[10]
3. Replacement of fractured portion may be less time consuming than needed for completion of a provisional restoration.[11]
4. A positive emotional and social response from the patient for preservation of natural tooth structure.[12]

Reattachment of dental fragment has become possible due to the improvement of adhesive technique and restorative materials.[13,14,15] The possibility of dentin hybridization allows successful performance of dental treatment previously difficult by means of conventional techniques.[16,17]

The purpose of this article is to discuss the considerations for dental fragment reattachment technique and to present a clinical case report of fracture involving enamel and dentin.

II. Case Report

A 25 year old male patient reported to the Aesthetics Dental Clinic,Athens,Greece with a chief complaint of broken upper front tooth region since 2days. (fig.1)He gave a history of trauma 2 days back. On examination, the maxillary left central incisor was fractured. The tooth showed a complicated crown fracture and had a fracture line passing through the pulp at cervical one third of the tooth. Initial examination revealed a green stick type of fracture with pulp exposure on the labial surface of maxillary right central incisor. The fracture was not evident palatally.

Patient's lower lip was lacerated and oral hygiene was poor. Patient was asthmatic and was taking medication; therefore rubber dam was not used during the treatment procedure. During the clinical examination, it was determined that the biological width was only minimally invaded. (fig.2)



Figure1: Preoperative intra-oral photograph showing fractured 21 Figure2: Pre-operativeradiograph

Then access opening and working length was determined with no. 10 K file. (fig.3) Fractured fragment was detached using a tweezer and was stored in saline.(fig.4.) Instrumentation was done. Copious irrigation was done with 3% sodium hypochlorite during instrumentation.



Figure 3: Working length



Figure 4 Sectional obturation and post space Prepared

Sectional obturation was done using AH plus sealer.(fig.4) .After the root canal treatment was completed, then Post space preparation was done (fig 5); self-cure resin cement was mixed and applied to the canal and post. Fiber reinforced post was cemented into the canal.(fig.6)The enamel were etched with a 37% phosphoric acid gel, rinsed, and coated with an ethanol-based adhesive system . It was light cured for 20 seconds. Then the fractured surface of the fragment was treated with 37% phosphoric acid gel, followed by delicate rinsing. The adhesive system was then applied to the etched surface and light cured. (fig.7)



Figure 5: Fiber reinforced post



Figure 6; Fiber post cemented



Figure 7: Fractured fragment reattached

III. Discussion

Reattachment of the fragment to its original position is considered an excellent approach for the management of a coronal fracture. If the extra-oral time of the fractured fragment increases, dehydration of the fragment can occur. [9] Therefore, in order to prevent this case, it is recommended that the fragment be kept in a medium such as physiologic saline. Fiber-reinforced posts are fabricated to bond with most resin cements and resin-based composite core materials. [10,12] Successful bonding minimizes the wedging effect of post within the root canal, requires less dentin removal to accommodate a shorter and thinner post, and leads to lower susceptibility to tooth fracture. [15,16] Factors influencing the extent and feasibility of such repairs include the site of fracture, size of fracture remnants, periodontal status, pulpal involvement, maturity of root formation, biological width invasion, occlusion, time, and resource of the patient. [14] Post-placement in addition to bonding, serves to retain the coronal portion via a friction bond, and assist in preventing dislodgement non-axial forces. [10,12,13,16]

The dentist plays an important role in the management of injured cases and so he has to take into consideration every possibility of saving a tooth that has received trauma. [17] The remarkable advancement of adhesive systems and resin composites has made reattachment of tooth fragments a procedure that is no longer a provisional restoration, but rather a restorative treatment offering a favorable prognosis. However, this technique can be used only when the intact tooth fragment is available. [18,19]

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In this era of conservative, esthetic dentistry, the reattachment of fractured tooth segments has established itself as a realistic treatment option in the restoration of fractured teeth. [16,17,19]It permits rapid restoration of original tooth contours and overall esthetics with greatly reduced chair time for both the patient and operator.[18,19,20]

The use of tooth fragment reattachment technique to preserve the fractured segment of a tooth has been in the literature for decades. [19] As described in previous studies, this case report shows that the adhesive reattachment of the original fragment offers a conservative, esthetic, and costeffective restorative option. Furthermore, it is an acceptable alternative to resin-based composite restorations for restoring esthetics and function of obliquely fractured teeth. [18]Reattachment of an autogenous tooth fragment also has the advantage of biological width, which is the sum of the epithelial and connective tissue attachment lengths.[18,19,20]

IV. Conclusion

Currently, with the available materials, in conjunction with an appropriate technique, esthetic results can be achieved with predictable outcomes. Thus, the reattachment of a tooth fragment is a viable technique that restores function and esthetics with a very conservative approach.[17]

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