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CASE REPORT

IMMEDIATE REATTACHMENT OF FRACTURED TOOTH FRAGMENT USING FIBREPOST AND COMPOSITE - A CASE REPORT

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ABSTRACT

Reattachment of tooth fragment of anterior teeth is easy to practice and economic method that has the potential to assume the incisal strength during tooth functioning. The method ensures increased wearing steadiness and thus creates better function. This clinical case report tries to throw light on certain aspects of the reattachment technique used on fractured teeth. The clinical and radiographic examination revealed a complicated oblique crown fracture that was treated by doing RCT and reinforcing with a prefabricated fibrepost. The fractured segment was then accurately placed on the tooth, later post in the canal was cemented. Tooth jewellery was used to camouflage fracture line and also to enhance the esthetics. The clinical results appear to be positive and they show that this technique is easy to perform and standardize, inexpensive and that it allows both functional and aesthetic benefits.

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INTRODUCTION

The uncomplicated crown fracture of anterior teeth is the most common traumatic injury of permanent dentition. The upper central incisors are most frequently affected by traumatic injuries (80%), and this high incidence can be related to the anterior anatomical position. Several factors influence the management of coronal tooth fractures, including extent of fracture (biological width violation, endodontic involvement & alveolar bone fracture), pattern of fracture and restorability of fractured tooth (associated root fracture), secondary trauma injuries (soft tissue status), presence/absence of fractured tooth fragment and its condition for use (fit between fragment and the remaining tooth structure), occlusion, esthetics, finances, and prognosis. Patient cooperation and understanding of the limitations of the treatment is of utmost importance for good prognosis. Reattachment of original tooth fragment has certain advantages such as natural tooth contours, texture, color, translucency with better esthetic. Furthermore, it enhances the durability because of natural incisal wear resistance of a sound dental tissue. The procedure is acceptable in permanent as well as primary tooth as it is a conservative, cost-effective and a less time-consuming restorative option. Management of traumatized tooth by biologic tooth restoration has optical and mechanical properties equivalent to a natural tooth. Therefore, in comparison to composite tooth restoration, biologic tooth restoration is always a promising treatment option. Tennery (1988) was the first to report the reattachment of a fractured fragment using acid-etch technique. Starkey (1979) and Simonsen (1982) have also reported such cases. 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 minimal preparation. Reattachment of tooth fragment of anterior teeth is easy to practice and economic method that has the potential to assume the incisal strength during tooth functioning. The method ensures increased wearing steadiness and thus creates better function. Other advantages of this method are the psychological comfort of patient, less time spent in dental chair, exact reconstruction of tooth's morphology and usage of

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structure that wears out as the antagonist. This article reports on coronal tooth fracture case that was successfully treated using tooth fragment reattachment.

CASE REPORT

A 19-year-old female patient reported to the Dept. of Conservative Dentistry and Endodontics, after sustaining a complicated crown fracture to her maxillary left lateral incisor during running. The fractured tooth fragment was partially attached palatally. Clinical and radiographic examination revealed a complicated oblique crown fracture that was supragingival on the labial area. Fig. 1, 2.

Figure 1. Preoperative images

Figure 2. Preoperative IOPA

Upon examination, the treatment options were presented to the patient (1) no treatment, (2) crown buildup restoration with a resin based composite, and (3) reattachment of the tooth fragment. After discussing about the advantages, disadvantages, prognosis, and cost of every treatment option, the patient opted to have the tooth fragment reattachment. It is important to note that the reattachment option was presented only after confirming that the fragment was in good condition and that it fitted reasonably well on the fractured tooth. Upon probing the gingiva during the clinical examination, it was determined that the biological width was not invaded. The tooth fragment comprised of 1 piece, which was attached partially to the palatal aspect. LA was administered and the operating field was isolated with a rubber dam toensure moisture control. First, the fractured fragment of the tooth was stabilized and reattached before root canal opening was done. Dentin and enamel were etched with a 37% phosphoric acid gel, rinsed, and coated with an ethanol-based adhesive system (Adper Single Bond Plus, 3M ESPE). The adhesive was not light cured at this point. Also the fractured surface of the fragment was treated with 37% phosphoric acid gel for 30 seconds, followed by delicate rinsing. The adhesive system was then applied to the etched surface. Flow able composite resin (Brilliant, Dentsply) was applied to both fragment and tooth surfaces. The fractured segment was then accurately placed on the tooth, paying special attention to the fit between the segments. When the original position had been reestablished, excess resin was removed and the area was light cured for 40 seconds on each surface, making sure that no displacement of the fragment occurred before adhesive/resin polymerization was complete (Figure 3)

Figure 3. Treatment and application of flowable composite on the broken fragments

The margins were properly finished with diamond burs and polished with a series of Sof-Lex disks (3M ESPE) and diamond polishing paste. After reattachment, the root canal therapy was completed in a single sitting using K files and obturation done using lateral condensation technique. (Figure 4)

Figure 4. WL and Obturation IOPA

Figure 5. Fibre post cemented

Figure 6. Fibre post kit and Tooth jewellery set

Post space was prepared using peeso reamers {supplied by manufactures of fibre-post (easypost, dentsply)} leaving behind 5mm of guttapercha and fibre post fit was verified radio graphically. Para core dual cure resin was used for the cementation of post following manufacturer's instructions. Post in the canal was first cemented and cured (Figure 6). Tooth jewellery (Coltene) was used to camouflage fracture line and also to enhance the esthetics. It was placed with the help of flowable composite on the distoincisal corner of the tooth and cured. (Figure 7)

Figure 7. Post operative image

The occlusion was carefully checked and the patient was dismissed after receiving instructions to avoid exerting heavy function on this tooth and to follow regular home care procedures relative to oral hygiene. The patient returned for 12 month follow-up and it was observed that both endodontic and restorative treatments remained clinically acceptable for the entire time. Although the reattachment line can be noted in a close-up view, the patient was very satisfied with the results and opted not to have the line masked with a partial composite veneer.

DISCUSSION

This clinical case report tries to throw light on certain aspects of the reattachment technique used on fractured teeth. Among all the possible operative solutions of this technique, the authors chose to remain most conservative, and did not perform any preparation on the fractured margins. Important factors for tooth reattachment are: the degree of the fragment's adaptation to the remaining structure; fragment retention; fracture location; and pattern. The quality of fit between the fragments is clinically important factor for the longevity of the reattached crown. Use of prefabricated post provides the increased retention as well as the distribution of forces along the route. According to the amount of the restoration, screw posts, cast posts or dentin pins could be used for supporting the fragment. Different reattachment techniques involved are Enamel Beveling; V-shaped Internal Enamel Groove; Internal Dentin Groove; External Chamfer; over contouring; Simple reattachment etc. Hayashi *et al*. indicated that, the best restorative methods are needed to be identified for teeth with extensive loss of structure, and reinforcing pulp less teeth. However, when a tooth has more than 50% of its coronal structure missing, the use of a post-and-core foundation is recommended prior to restoration. Tooth coloredfibre posts have several advantages. They are more aesthetic and bond to tooth tissue. The use of fibre post increases retention and distributes the stress along the root, with the help of the glass fibre post the fractured crown can be permanently bonded to the root. Thus, it reduces the possibility of tooth fracture during function or traumatic injury. The techniques described in this case report are reasonably simple, while restoring function and esthetics with a very conservative approach.

Conclusion

According to our clinical evaluation, the restoration of a fractured crown using the adhesive reattachment is the optimal treatment for an enamel-dentin fracture when the tooth fragment is available, intact and well preserved. The clinical results appear to be positive and they show that this technique is easy to perform and standardize, inexpensive and that it allows both functional and aesthetic benefits.

Essential advantage of the reattached tee this the fact that all the alternative methods as direct adhesive resin reconstruction, veneers and crowns can be performed in case of failure.

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