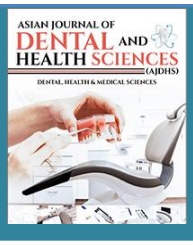

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Endodontic Management of Crown Fracture Using Reattachment Technique with Fibre Post: Case Report

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Abstract

Anterior crown fracture from trauma is quite embarrassing for the patient because it impacts the facial esthetics of the person. These traumatic dental injuries are found to be maximum in the maxillary incisors. Treatment of these fractures poses a challenge to the clinician as the main objective of the treatment is to restore esthetics and phonetics of the patient along with pain management. Several treatment methods are available but restoring the patient's own fractured fragment of tooth if available is the most viable restorative technique as it provides fast and esthetically pleasing results. Hence, this article reports the successful management of crown fracture which was treated with reattachment technique using fibre post.

Keywords: crown fracture, trauma, reattachment, fibre post

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Introduction:

Coronal fractures of teeth are the most common consequence of dental trauma. Injury strikes maximum in the maxillary central incisors, followed by maxillary lateral incisors, mandibular incisors and maxillary canines being less frequent. This sequence is due to their location in the mouth. Traumatic injuries have physical, psychological and social impact on the quality of life of the patients.[1] Restoring coronal fractures poses challenge to the clinician as it requires proper diagnosis and treatment plan. Several factors need to be kept in mind like the position of fracture line, biologic width, presence or absence of pulpal involvement, presence or absence of the broken fragment with its viability for usage, occlusion and the esthetics of the concerned patient before implementing proper treatment planning.[2] Fracture restored with composite resin, fragment reattachment, endodontic treatment with post core supported prosthesis are different modes of treatment to replace the broken tooth. If the broken fragment is found to be in good condition, reattachment is the most viable option of fracture tooth management as it restores the original morphology alongwith function of tooth and esthetics. Furthermore it is also economical treatment which provides an emotional and psychological response to the patient.[3] The following case report presents management of coronal fracture of maxillary central incisor by reattachment.

Case Presentation:

A 28-year-old male reported to Department of Conservative Dentistry and Endodontics with chief complaint of pain in fractured upper anterior tooth due to road traffic accident an hour before. Clinically Ellis class III fracture in right maxillary central incisor (11) was detected (Figure 1). On intraoral examination, soft tissue injury and mobility of the injured tooth was not evident. Patient medical history was nothing significant. Fractured fragment was just loosely attached to leftover tooth structure. Removal of broken fragment was done under local anaesthesia (2% Lignocaine) and stored in normal saline to maintain hydration and natural appearance (Figure 2). Patient was interested in maintaining the tooth by reattaching the fragment. As the fragment was found to be in good condition, patient was explained about the procedural approach of reattachment. Pulp chamber was exposed after removal of the fragment, hence working length was found with apex locator (Root ZX, J Morita Corp., Japan). Cleaning and shaping of canal was completed using hand files upto master apical size of 60 K file with intermittent

irrigation by 3%sodium hypochlorite. Canal was dried with paper points and obturation was completed with sectional method maintaining 5mm of apical seal. Post space preparation was done with Peeso reamers for the placement of glass fibre post in canal and proper length of post was confirmed with a radiograph. Coronal end of post was cut with diamond abrasive points such that 4mm of post is available above the coronal surface of remaining tooth structure to enhance the retention of the fragment. A vertical groove of certain depth was prepared on the dentin surface of fractured fragment using round carbide bur which helped in fitting the fragment to the post extension. The fractured fragment, fibre post and remaining tooth structure along with the root canal was etched with 37%orthophosphoric acid for 15 seconds, rinsed, blot dried and bonding agent was applied. Light curing was done for 30 seconds for the remaining tooth and fibre post. Fibre post was luted with resin cement (Calibra, Dentsply Sirona) and placed in the canal and flowable composite (Tetric N Flow, Ivoclar Vivadent) was used to fill up the dentinal groove and remaining canal space. Fragment was properly approximated to the actual leftover tooth structure and light curing was done. Composite finishing bur was used to get rid of the excess material and occlusion was checked with the antagonist tooth (Figure 3). Patient recalled after 1 month for follow up and radiograph was taken which showed proper fit and adaptation of the fragment (Figure 4).

Figure 1: Fracture of crown (11)

Figure 2: Removal of fractured fragment

Figure 3: Fragment approximation reattachment

Figure 4: 1 month follow up radiograph

Discussion:

Traumatic injuries of permanent incisors with pulpal involvement constitutes 11%-15% out of which 96% involves maxillary central incisors.[4] Traditional methods of treatment of fractured tooth were cast metal post and core supported by prosthesis, use of composite resins for fracture treatment. But disadvantage of composite resins was that this material does not resemble enamel or dentin structurally as that of original tooth though they possess optical properties.[5] However, use of cast metal post with metal ceramic or all ceramic crowns causes wearing of enamel of the opposing dentition which can lead to sensitivity to the patient and chances of post fracture is also high in cast metal post core. With the advancement of adhesive dentistry, reattachment of fractured fragment provides a better choice for treatment provided that biologic factors, materials and techniques are well assessed and managed. Reattachment procedure reduces the chances of wear of natural tooth and maintains benefit of preserving original colour match, contacts, contour and incisal translucency.[6,7] Reattachment is a conservative and cost-effective approach for anterior tooth fracture which also gives psychologically positive response to the patient as the natural tooth structure is preserved. For reattachment procedure, storage of the broken piece has been reported an important factor to maintain the vitality and original esthetic appearance of the tooth. Different storage medium includes normal saline, distilled water, saliva, milk and Hanks balanced solution. In this case, the fractured fragment was removed and kept in sterile isotonic saline solution to maintain hydration.[8] Martos et al revealed no significant effect was found on survival, colour and bonding strength of the restored tooth based on the storage medium used for broken fragment.[9] Fractured fragment was found to be in good condition with accuracy in fitting to the remaining tooth structure with the fracture line. Hence, reattachment using fibre post was chosen as the treatment plan for this case. Fibre posts was

considered over cast metal posts as fibre posts are esthetic, exhibits good bonding to between post and cement, less chairside time and elastic modulus similar to that of dentin which allows uniform distribution of occlusal stresses in the radicular dentin thus minimizes possibility of tooth fracture.[10,11] Using fibre posts in addition with composite and adhesive materials creates a monoblock which further helps in reinforcement of the tooth structure.[12] Reis et al reported that fracture resistance of tooth when done by simple reattachment was 37.1% but placement of vertical internal groove in fracture fragment or superficial overcontouring enhances the fracture resistance to 90.5%.[13] In this case vertical internal grooves were placed in fractured fragment to increase fracture resistance. Dual cure resin cement with self-adhesive property was used for cementation of the fibre post in root canal as this cement possess high bond strength and reduces microleakage. Fragment reattachment was completed to the remaining crown structure using flowable composite resin over the fracture line that provides proper colour stability, minimizes inclusion of voids and aids to attain bond strength of the fragment to the tooth structure.[14]

Conclusion:

Treatment and material advances related to adhesive dentistry has proved reattachment as minimally invasive treatment for revitalizing esthetics and function with a successful outcome. For traumatized patient with fractured teeth, reattachment procedure serves the primary choice of treatment as it maintains natural esthetics without sacrificing natural tooth structure.

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