Case Report

Management of Labio-Palatally Split Maxillary Central Incisors by Reattachment- An Aesthetic Approach: A Case Report.

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ABSTRACT

The majority of dental trauma involves anterior teeth, especially the maxillary central incisors. Different approaches for treating these fractured teeth have been reported in the literature. The type of treatment rendered depends mainly on the extent of fracture, pulp involvement, radicular fracture, biologic width infringement or violation, and presence of the fractured piece. Various treatment modalities have been practiced in past but reattachment of fractured fragment is considered tobe most conservative, natural and esthetic approach. The restoration of natural teeth form,color and alignmentin these patients create a positive social and emotional response in such patients.

Keywords: Dental Trauma, Fractured teeth, Reattachment.

INTRODUCTION

Oral trauma is a frequent injury and can be as high as 18% in a young population.[1–3] Of these traumas, clinical crown fractures are the most frequent in anterior teeth with an incidence that ranges between 2% and 5%.

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The position of maxillary incisors and their eruptive pattern carries a significant risk for trauma. A trauma with accompanying fracture of anterior teeth is a tragic experience for the patient who requires immediate attention, not only because of damage to the dentition but also because of psychologic effect of the trauma.[4–6]

Several factors influence the management of coronal tooth fractures: extent of fracture (biological width violation, endodontic involvement, alveolar bone fracture), pattern of fracture, restorability of fractured tooth (associated root fracture), secondary trauma injuries (soft tissue status), presence/absence of fractured tooth fragmentits condition for use (fit between fragment and the remaining tooth structure), occlusion, esthetics, finances and prognosis.[7,8]

Various treatment modalities have been practiced in past to restore the fractured anterior teeth including composites, laminates, esthetic crown or the reattachment of fractured fragment. Among which reattachment of fractured tooth fragment is considered one of the most conservative, biologic and esthetic approach provided fractured tooth fragment is retained.[9-14] Significant advancements in adhesive dentistry have allowed dentists to use the patient's own fragment to restore the fractured tooth.Reattachment is a conservative procedure having several advantages maintains original tooth contour and translucency, colour remains stable over time, less chair side time is required, reduces cost of treatment and incisal edge wears at a similar rate to adjacent teeth. Additionally, This approach provides positive psychological and social response from the patient.[15]

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CASE REPORT

A 25 year old male patient reported in the Department Of Conservative Dentistry and Endodontics at Maharaja Ganga Singh Dental College and Research Centre with chief complaint of pain and mobility in upper front tooth region since one day with a history of trauma. The cause of trauma was fall on ground due to obstruction by an object in his way. Patient got some treatment done in the same tooth region by a local practitioner but was then referred to the college. Medical history of patient was found to be non-contributory.

Clinical examination revealed Ellis' Class III fracture involving enamel, dentin and pulp in relation to both Maxillary Central Incisors i.e. 11, 21. A mesiodistal fracture line extending from the incisal edge to 2mm below the CEJ on the palatal aspect splitting the tooth into 2 halves, a labial and a palatal irt 11. In tooth 21, a mesiodistal fracture line extended from palatal aspect to 2mm below the CEJ palatally, again splitting the tooth into a labial and palatal half. An access cavity from the previous treatment was seen in the palatal aspect in relation to 21. Also there was loss of tooth structure in the mesio-incisal edge portion. Palatal fractured segments of both the teeth were mobile with inflammation of the marginal gingiva on the palatal aspect. There was no associated bone and soft tissue injury (Fig. 1 and 2).

Figure 1: Pre-Operative Photograph (Buccal)

Figure 2: Pre-Operative Photograph(Palatal)

The labio-palatal nature of the injury did not present any significant radiographic finding. No periapical radiolucency was seen (Fig. 3)

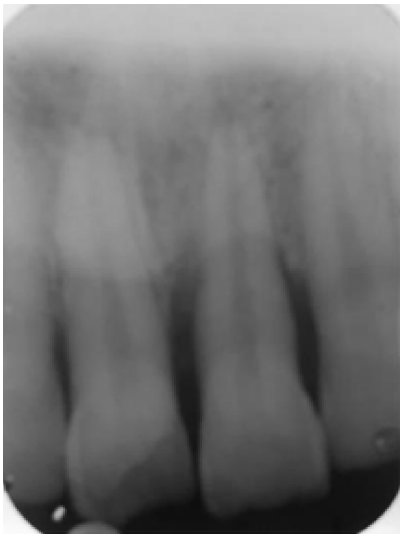

Figure 3: Pre-Operative Radiograph

Upon analysis, various treatment options were presented to the patient, regarding their advantages, disadvantages, cost and prognosis. Reattachment option was presented only after confirming that the fragments were ingood condition and that they fit reasonably well on the fractured teeth. The patient opted to have the tooth fragment reattached.

The treatment plan was decided as follows: Detachment of the fractured portions followed by single visit root canal treatment and subsequent Reattachment with adhesive resin. Aesthetic correction with direct composite.The parent's informed consent was obtained before commencement of the treatment.

Local anaesthesia (2% Lignocaine with 1:100000 epinephrine) was administered on the labial aspect

with local infiltration and nasopalatine nerve block on the palatal side. A template was formed by rubber base impression material. Fractured palatal portions were removed with the help of tweezers from both the teeth (Fig. 4 and 5).

Figure 4: Teeth after removal of fractured fragments

Figure 5: Fractured fragments

Fractured portions were kept in ORS solution till rest of the procedure. Bleeding was controlled with pressure pack compression for few minutes. The Root Canal Treatment was initiated in both the teeth simultaneously.

Canal orifice was located and patency was ascertained using a small size K−file (Kerr, Orange, California). Working length was established with the help ofa working length radiograph (Fig. 6). The canal was cleaned and shaped with hand K−files (Dentsply, Maillefer, Switzerland). The canal was sequentially irrigated using 5.25% Sodium hypochlorite and saline during the cleaning and shaping procedure. The canal was thoroughly dried and obturation was done using Guttapercha (Dentsply, Maillefer, Switzerland) and AH Plus sealer (Dentsply, Maillefer, Switzerland). Fit of the fractured portion was checked on the attached portion before proceeding further. Isolation of both teeth was obtained with the help of cotton rolls. Haemostasis from the palatal gingiva was achieved with the help of placement of cotton pellet dipped in adrenaline bitartrate (1mg/ml) (Vasocon) for 10 minutes.

Acid etching was done with 37% phosphoric acid (Scotchbond Multi-Purpose Etchant, 3M ESPE) of both the attached portion and the fractured portion. After etching, rinsing and drying a dual cure adhesive resin (RelyX U200, 3M ESPE) was taken and mixed in equal proportions. It was applied both on the attached and the fractured portion. The fractured portions were then reattached to the respective teeth stabilized by the putty template for 5 minutes (Fig. 7). A high intensity curing light was applied for 20 secs to help in light curing of the resin. Excess cement was removed from the margins with the help of periodontal curette. A chamfer was created with the help of a round bur along the fracture line at the incisal edge of 11 and restored with direct composite.Aesthetic corrections were made in 21 both from the labial and palatal aspect (Fig. 8,9 & 10). patient remain a symptomatic till he last reported three months after treatment (Fig. 11).

Figure 6: Determination of working length

Figure 7: Reattachment of fragments using template

Figure 10:Post-operative Photograph (Buccal View)

Figure 8: Post-operative radiograph

Figure 11: Three months follow up IOPA

Figure 9: Post-operative photograph (Palatal view)

DISCUSSION

Tennery[16] was the first to report the reattachment of a fractured fragment using acid-etch technique. Subsequently, Starkey[13] and Simonsen[14] have reported success with similar 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.[17] However, composite resin has the disadvantages of poor abrasion resistance in comparison to enamel,[18] water absorption and staining. Reattachment techniques for tooth fragments present several advantages over restorations obtained

with composite resin systems: better and long-lasting esthetics, improved function, immediate results, a positive psychosocial response, and faster and less complicated procedures.[19-22]

Use of several techniques of reattachment has been shown in literature by different authors at different times. But only few have attempted to evaluate the fracture strength of the reported techniques and their results vary considerably among researchers.[23] Clinicians have employed an assortment of bevel designs, chamfers, dentinal and enamel grooves, and choices of resin composite materials and techniques for the reattachment of tooth fragments. It was shown that simple reattachment recovered only 37.1% of intact tooth fracture resistance, while the buccal chamfer recovered 60.6%; and the over contour and internal groove techniques nearly reached intact tooth fracture strength, recovering 97.2% and 90.5%, respectively.[7] It is interesting to note that in our case, the space provided by the pulp chamber served as inner dentinal groove providing an inner reinforcement, thus avoiding any excessive preparation of the fractured teeth. Also, preparation of an external chamfer on fracture line and its restoration with direct composite supplemented the fracture resistance of the reattached fragments.Various materials are available to clinicians for reattachment, each with its own particularities and indications; thus, choosing which material to use may be difficult. Resin cements possess superior mechanical properties, as they are relatively insoluble, can withstand the stresses of the oral environment, provide excellent retention, and are capable of maintaining the integrity of the tooth and restoration.[24] The bonding properties of resin cements are related to the chemical composition. The organic matrix of the cement, consisting of multifunctional phosphoric acid methacrylates, is proposed to be capable of simultaneously demineralizing and infiltrating the tooth surface.[25] The phosphoric and carboxylic groups of polyalkenoic acid form ionic bonds with hydroxyapatite, thereby ensuring a second means of retention.[26] A multicenter clinical study of 330 tooth fragment reattachments reported retention indexes of 50% and 25% at 2.5 and 7.0 years, respectively.[8] Another study, conducted by Cavalleri and Zerman, [26] compared two kinds of treatments for coronal fractures, namely direct adhesive restorations and fragment reattachment. The best performance after 5 years was that of the tooth fragment reattachment technique, particularly regarding esthetic results.

CONCLUSION

Several aspects govern the choice of a technique or the association of materials for fragment reattachment. However, the literature indicates that if the material or a combination of materials chosen has proven to be effective in in vitro studies and there is no incompatibility between them, the kind of material used for the reattachment of fractured teeth is less important. The reinforcement technique used for the reattachment procedure governs the strength of the fractured tooth fragments.

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