

AUTOLOGOUS REATTACHMENT OF COMPLICATED CROWN- ROOT FRACTURES:A CASE REPORT

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ABSTRACT:

Traumatic dental injuries (TDIs) of young permanent teeth occur frequently in children and fledgling adults. Complicated crown- root fractures and luxations are most common dental injuries. Proper diagnosis, treatment planning and followup are important for improving a favorable outcome. Successful pain management of impaired function, esthetics, and phonetics should be the prime objective when handling such cases. Therefore, reattachment of fragment to a fractured tooth remains as the treatment of choice because of its simplicity, natural esthetics, and conservation of tooth structure. This article describes immediate treatment of oblique crown root fracture of maxillary left lateral incisor and its successful management has satisfying esthetics and excellent function with no sign of resorption or ankylosis.

Keyword: Dental Trauma; Tooth; Fall; Crown-Root Fracture; Multidisciplinary Approach.

1. INTRODUCTION:

Traumatic dental injuries (TDI) have a global prevalence of 10- 15% ^[I] which occur with great frequency in preschool, school-age children and young adults comprising 5% of all injuries for which people seek treatment. ^[II]TDIs are more prevalent in primary as well as in permanent dentition with the maxillary anterior teeth being the most commonly affected area. ^[III] Among all TDIs, luxation injuries are the most common in the primary dentition, whereas crown fractures are more commonly reported for the permanent dentition. ^[IV] Crown-root fractures account for 5% of all dental injuries affecting the permanent teeth.

They can be broadly classified into two main variants such as complicated and uncomplicated. Complicated crown fractures constitute only 4-16% of all traumatic injuries. ^[V] Clinicians pose

major restorative dilemmas and challenges for complicated crown and crown root fractures. Several factors may affect the management of a fractured tooth such as biologic width violation, endodontic involvement, remaining tooth structure, presence of fractured segment. ^[VI]

Various methods and techniques have been advocated to restore fractured teeth such as resin crowns, stainless steel crowns and adhesive composite restorations. ^[VII] Advances in dentinal adhesives and acid-etch technique has led to a growing interest in the tooth reattachment procedure. This is possible when tooth fragment is preserved after trauma. The advantages of tooth fragment reattachment over conventional composite restoration are conservatism, favorable wear mechanism, colour match of the remaining crown portion, preservation of incisal translucency and maintenance of original tooth contours. ^[VIII]

Complicated crown-root fractures usually require a multidisciplinary approach to deliver predictable esthetics and proper function. The prevalence of reattachment procedures is low, despite a number of successful reattachment cases and research studies are reported in literature. The aim of this case report is to present a fractured maxillary left lateral incisor, successfully managed by endodontic treatment, fiber post-core system followed by crown reattachment.

2. CASE REPORT:

A 13-year-old boy was referred to the Department of Pedodontics and Preventive Dentistry with the chief complaint of broken upper front tooth. The patient gave history of falling on his face accidentally while playing about a week ago. The patient's medical history was noncontributory. On clinical inspection, extra oral examination exhibited no apparent trauma to the soft tissues. On intraoral examination, it was revealed that the permanent maxillary left lateral incisor (22) had a complicated crown-root fracture and the mobile coronal fractured fragment was attached palatally. The fracture line extended from 1mm coronal to the CEJ on buccal enamel surface and just apical to the CEJ on palatal root surface [Figure-1]

On radiographic examination, intra oral periapical radiograph revealed absence of root and alveolar bone fractures, with matured apex and absence of periapical pathology in relation to 22 [Figure-2]. On the basis of clinical and radiographic examination, a final diagnosis of a complicated crown-root fracture of the permanent maxillary left lateral incisor (22) was made. Treatment procedure was explained to the patient and the parents and informed consent was taken. Routine blood investigation was done.

As a definitive treatment, the fractured tooth fragment was carefully separated from tooth 22 [Figure-3]. It was stored in normal saline to prevent dehydration. Tooth 22 was carefully evaluated for biological width violation and no such violation was observed. Local anesthesia was administered and single sitting root canal therapy with temporary restoration was done in respect to tooth 22. In next visit, post space was created by removing guttapercha using peizo reamer No.3 in a sequential manner. Appropriate pre-formed light-transmitting fiber post was tried and selected. Root and post space of 22 was etched, rinsed and then dried. Bonding agent (Prime and Bond NT Dual Cure; Dentsply Caulk, Milford, DE) was applied to the etched surface and was light cured (Woodpecker I LED) for 20secs. The post was cemented using dual cure resin [Figure- 4].

2.1 Crown fragment preparation:

The interferences of crown fragment 22 was slightly modified to receive a part of Fiber post within it and to act as a core. The pulp chamber of crown fragment was modified using a small round bur so as to accommodate the post. Fragment portion receiving the fiber post was etched, bonded and filled with dual cure resin paracore core buildup material (ColteneParacore Kit), followed by accurately placing the tooth fragment over post and was light cured (Woodpecker I LED) for 20 sec [Figure-5]. Routine follow up after 1 week, 1month and 1 year follow-up showed successfully retained fragment [Figure-6].

3. DISCUSSION:

An ideal treatment for a complicated crown fracture should suffice two important criteria i.e, aesthetics and function of the diseased tooth. Various factors dictate an ideal treatment option, such as- time lag between injury, initiation of treatment, level of tooth fracture line, stage of root development, extent of pulp involvement, condition and availability of tooth fragments and associated alveolar bone injury. ^[X]These factors must be considered while choosing an appropriate treatment protocol in complicated crown- root fracture.

For cases of complicated crown-root fractures, there are several proposed treatment options including a mucogingival flap, an osteotomy/osteoplasty and orthodontic or surgical extrusion followed by the reattachment of the original fragment. ^[X] Conventional treatment modalities for approaching crown-root fracture of anterior teeth range from minimally invasive procedure that include composite restorations and post-core supported prosthetic restorations to a more extensive one with the whole fractured tooth being replaced, but if fracture fragment is available, reattachment should be the first choice of treatment ^[X] and fibre post system is a logical option as it reunites the root portion to the coronal fragment along with acceptable aesthetic. But the mechanical properties are comparatively inferior to metal posts.

The use of tooth fragment reattachment technique to preserve the fractured segment of a tooth has been in the literature for decades. ^[XI] As described in previous studies, this case report shows that the adhesive reattachment of the original fragment offers a conservative, esthetic, and cost-effective restorative option. Furthermore, it is an acceptable alternative to resin-based composite restorations for restoring esthetics and function of obliquely fractured teeth. 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.

Thus in any possible clinical scenario, reattachment of the fractured tooth segment should be attempted in priority if the case favors, as it is aesthetically more predictable for translucency, opalescence, fluorescence, characterizations and texture of the surface. In young children it provides psychological benefit compared to other treatment modalities. Studies have also concluded that strength and fracture resistance attained with fragment reattachment is superior to composite restorations though it may not match intact tooth.

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Figure-1: Pre-operative view of crown-root fracture of the left permanent maxillary lateral incisor



Figure-2: Fracture line on 22 extending just below the subgingival margin on the buccal and lingual surfaces.



Figure-3: Fractured tooth fragment was carefully separated from tooth 22



Figure-4: Complete Root canal therapy was done on the first visit followed by



Figure-5: Post-operative view of the crown fragment of 22 with fiberpost.



Figure-6: One year follow-up showed successfully retained fractured tooth fragment of 22.

