Case Report

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A Holistic Approach of Rehabilitating Complicated Crown Root Fracture of Maxillary Central Incisors: A Case Report.

Abstract:
Traumatic injury to anterior teeth isfrequent in children and adolescents owing to an active lifestyle. Proclined maxillary incisors are more prone to fracturedue to their location in the oral cavity. Complicated crown root fractures present endodontic, restorative and aesthetic challenge and requires a multidisciplinary treatment approach to achieve predictable success.This case report describes, multidisciplinary management of such complicated crown root fractures following traumatic injury.

Key-words: Crown root fracture, Crown lengthening, everStick Post, Smile Designing

Introduction:

Traumatic dental injuries (TDIs) account to 5% of all health injuries and up to 17% in preschool children and adolescents.[1] Complicated crown root fractures involve enamel, dentin and part of the root with fracture line often passingsub gingivally below crest of alveolar bone, presenting a very difficult situation for restoration. Such fractured teeth are often considered to have poor prognosis post endodontically[2] and present with both functional and esthetic challenges necessitating a multi disciplinary approach for successful management of the same.

According to the recent guidelines from International association of dental traumatology, the treatment options for the complicated crown root fracture include various modalities of orthodontic/surgical extrusion, periodontal recontouring, root submergence, intentional replantation etc. following endodontic treatment.[3] This case report explains the management of complicated crown root fracture involving interdisciplinary approach.

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Case Report:

22-year-oldmale patient reported to the department of Conservative dentistry and Endodontics, Dayananda Sagar College of Dental sciences Bangalore, with the complaint of fractured upper front teeth following a road traffic accident 48 hrs back. On examination, soft tissue bruises were found on the upper lip and tender areas over the facial bony prominences. On intra oral examination crown fracture extending onto the root surface palatally with the loose fragment attached was noted wrtright central incisor. Crown fracture at the middle third with pulp exposure was noted wrt left lateral incisor. (FIG.1 (A-B)

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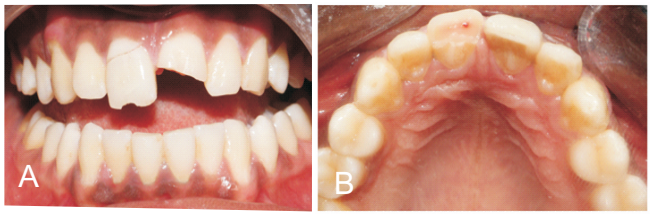


Fig. 1: A-B, Crown root fracture with the fragment retained irt 11 and crown fracture with pulp exposure irt 21

Radiographic examination revealed coronal fracture involving pulp irt 11 and 21. Single, intact root with single patent canal and widening of periodontal ligament space was noted. (FIG:2)Pulp sensibility tests showed negative response indicating nonvitality of 11 and 21 and no abnormal mobility was noted. Based on these findings, diagnosis of complicated crown root fracture irt 11 and complicated crown fracture irt 21 was arrived.

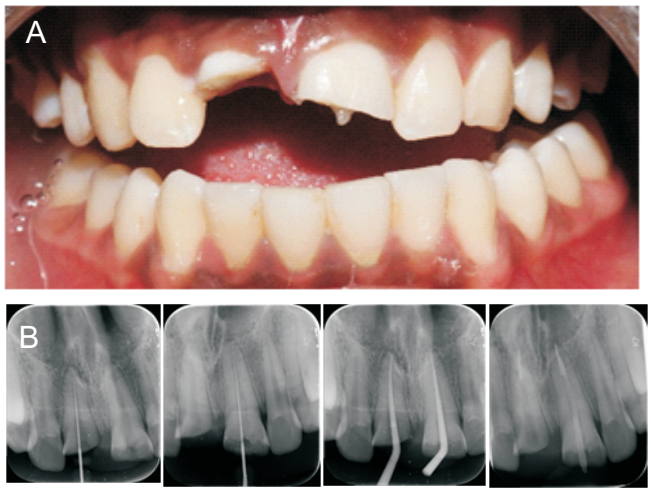
FIG 2: Fracture involving enamel dentin and pulp with fractured fragment remaining attachedirt 11, Fracture involving enamel dentin and pulpirt 21, Widening of PDL spaceirt 11 and 21

Treatment objectives included pain management, removal of fractured coronal fragment to assess the fracture extent on the palatal aspect of 11, to correct the gingival zeniths, thereby restoring proper function and aesthetics.

A omprehensive multidisciplinary treatment plan was formulated. As an emergency treatment pulp extirpation was done for both the central incisors and the fragment was stabilized using flowable composite as a temporary measure. On the next day the loose fragment was detached from the gingiva and stored in saline. The extent of fracture line was assessed, RED proportion was calculated digitally to be 67% and was found to be suitable for the patient. (FIG 3: A-C)An anatomical post and core for 11 and fibre post and core for 21 followed by full ceramic crowns were planned.

Treatment Done :

Single visit Root canal treatment with sectional obturation was completed for both the central incisors. Fibre post was cemented and core build up was done for 21. (FIG 3 A-B) Periodontal surgery irt 11 was done to expose the fracture line and a full thickness Mucoperiosteal flap was carefully reflected and 1mm of ostectomy was performed only at the subgingival fracture area with diamond round burs. Gingival contour and zenith corrections were also carried out.Suspensory sling sutures were used to stabilise the periodontal tissue, reposition the flap and a periodontal dressing was placed. (FIG4: A-C) During the early healing process, the patient had to refrain from mechanical tooth cleaning in the treated area. For plaque control, 0.2% chlorhexidine was applied twice daily to reduce bacterial contamination for 2 weeks. At the post-operative examination, periodontal healing was noted to be ideal and uneventful. (FIG 4: D)EverStick post was selected for rehabilitation of 11and was cemented after moulding it according to the canal configuration and composite resin core build up and tooth preparationfor full ceramic crowns was done(FIG 5:A-C).Crowns were fabricated according to the values obtained from digital mock up based on red proportion.



Lithium disilicate crowns were cemented using dual cure resin cement. (FIG 6: A-B)

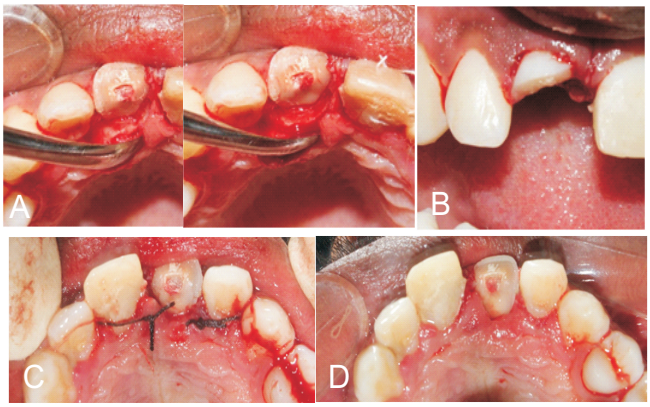


Fig. 4: A- Full thickness Mucoperiosteal flap reflection and ostectomy, B- Gingival contour and zenith corrections, C- Sling sutures placed, D- Healing after 1 week post operative period

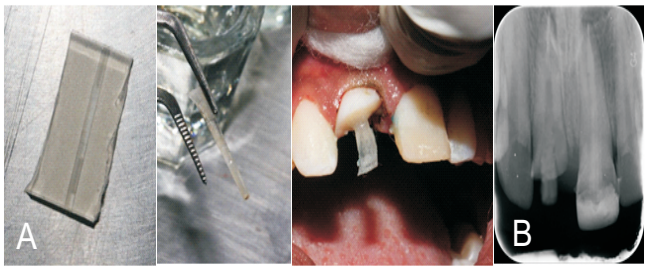


FIG 5: A-Everstick post moulded according to canal anatomy and cemented irt 11, B- IOPA- everstick post cementation irt 11

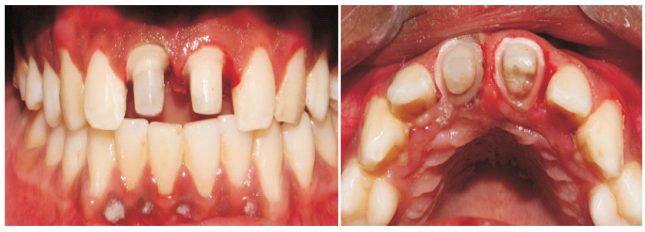


Fig. 5: C- Crown preparation for full ceramic crowns

Fig. 6: B – Pre and Post Operative

Discussion:

Thorough assessment of the patient after trauma is necessary to arrive at a proper diagnosis and sequential, well blended various treatment modalities must be planned and executed to achieve long-term success. [3]

Currently, several alternative treatments for teeth with subgingival fractures have been proposed. Exposing the fracture margin to a supragingival level, so that clinical restoration procedures can be conducted without contamination with blood and saliva, may be achieved, with gingivectomy and osteotomy /orthodontic or surgical extrusion procedures. Gingivectomy and osteotomy are simple and rapid procedures. Surgical extrusion is also onestep and less time-consuming, but may result in abnormal gingival zenith, resorption or ankylosis. Once the tooth is intentionally extruded, repositioned and splinted a follow-up time period is required to obtain adequate healing. Orthodontic extrusion is another option for the crown lengthening, although meets all the criteria and the alveolar bone surrounding the root will move along the tooth, it is essential that the constant slow force be maintained between the extrusion and hyalinization phases; otherwise, the desired orthodontic movement will not occur and takes a longer duration of time. Considering all these factors, periodontal surgery was preferred choice in this case[.4,5,6,7]

Next challenge was selection of root canal post for the post endo rehabilitation of 11 and 21. Varieties of materials are used for post construction including metal, resin composite and biological material into variety of shapes and surface designs. Prefabricated FRC posts with biomechanical advantages are preferred these days due to esthetics and elastic modulus. 8However, prefabricated FRC posts require post space preparation with corresponding size FIG 5: C- Crown preparation for full ceramic crowns FIG 6: A- Post crown cementation and composite restorations irt 22,23 a FIG 6: B – Pre and Post Operative drills which leads to further loss of root dentin and they cannot be used in teeth requiring angulation correction. For these reasons, Everstick post was selected for [11], which also has good light penetration and bonding to tooth. Everstick posts constitute resin impregnated (Bis-GMA) with unpolymerized glass fiber post. They are soft, flexible and can be customized thus can adapt to the

morphology of the canal giving best choice for curved, oval and large root canals and which require angulation change. It has flexural strength and elasticity very close to natural dentin resulting in uniform stress distribution minimizing the risk of root fracture.[9,10]

Lithium disilicate crowns were fabricated which have nparalleled optical and aesthetic properties, together with mechanical resistance, reduced thickness and favourable wear properties.[11]

Conclusion:

Periodontal surgery followed anatomical ever Stick posts and suitable restorations according to the aesthetic analysis will provide a favorable functional and aesthetic outcome for traumatized anterior teeth. For this a multidisciplinary treatment array is necessary to ensure aesthetically favorable and long-term success.

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