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Research Article *Dentistry*

ELLIS CLASS VIII TOOTH FRACTURE- A CONSERVATIVE TREATMENT APPROACH

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ABSTRACT

Dental trauma often has a severe impact on the appearance and wellbeing of the patient. Complicated crown fracture extending subgingivally often poses a challenge to restore. The present paper reports a case where trauma resulted in a complicated crown fracture of lateral incisor in a 25-year- old male patient. A combination of endodontic treatment followed by orthodontic root extrusion and adhesive restoration was chosen to provide conservative treatment with a good prognosis for the tooth.

INTRODUCTION

Traumatic dental injuries can become an important public health problem [1] not only because their prevalence is relatively high, [2, 3, 4, 5] but also because they have substantial impact on quality of life .[1, 4] Clinicians must therefore make every effort to save the teeth function and natural occlusion when treating patients.[6] Majority of dental injuries involve the anterior teeth [7] leading to restriction in biting, difficulty speaking clearly and feeling embarrassed to show one's teeth. Usually, treatment of such cases requires an interdisciplinary approach for complete rehabilitation.

In the present era, with the development of improved formulations of composites and adhesive systems treatment of crown fractures have become more effective. But on the contrary, fractures extending subgingivally complicate the adhesive restorations. In such cases, treatment options including tooth extrusion or crown lengthening may be needed prior to final restoration.[8] This case report outlines the management of complicated crown fracture N873.62(Andreasen modifications of WHO classification), maintaining periodontal health and alveolar bone.

CASE REPORT

A healthy 25-year-old man presented with the chief complaint of fractured upper front tooth and with a history of roadside injury 6months before. Clinical examination revealed oblique crown fracture of upper right lateral incisor (tooth no.12), 1mm supragingivally on the labial aspect extending equigingival on lingual aspect (Figure 1, 2). Remaining tooth structure was carious. The gingiva and soft tissues around the fractured tooth showed no abnormality. There was enamel fracture with respect to upper right central incisor (tooth 11). There was tenderness of tooth on application of digital pressure with no mobility. Vitality test done to remaining teeth with cold and electric pulp testing presented a positive response.

Figure 1 Complicated crown fracture

Radiological examination confirmed the findings of clinical examinations. Fractured line was confined to crown portion. Periapical radiolucency in relation to upper right lateral incisor (12) was noted. (Figure 3) On the basis of clinical and radiological findings, a diagnosis of complicated crown -root fracture 873.62 i.r.t to 12 and enamel fracture of 11 was made. A definitive treatment plan was made as follows- non surgical endodontic therapy of 12. After this orthodontic extrusion to move the fractured line 3mm above the alveolar crest and maintain the biologic width. And finally restore the tooth

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prosthetically following a post and core. The carious part of fractured tooth structure was removed and root canal therapy was performed (which further decreased the clinical crown portion). The canal was obturated with gutta-percha (Dentsply Maillefer, Ballaigues, Switzerland) with AH Plus resin sealer (Maillefer, Dentsply, Konstanz, Germany) using lateral condensation techniques. (Figure 4, 5)

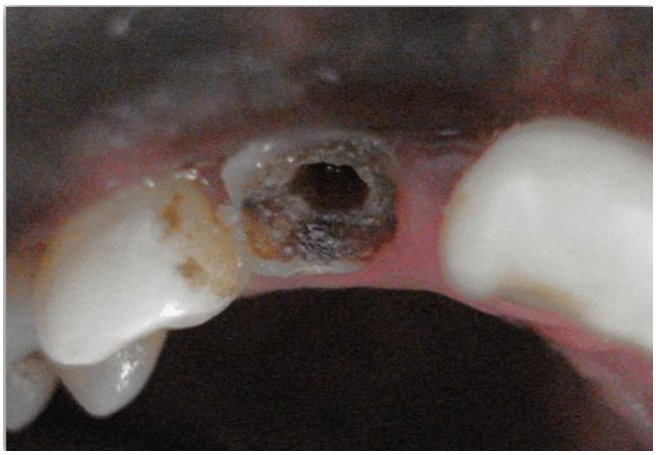

Figure 2 Palatal aspect of fractured crown

Figure 3 Periapical radiograph of 12

A week later, orthodontic extrusion was performed using elastic chain extending from a round stainless-steel wire, bonded between the two adjacent teeth (tooth no. 11 &13), to the begg bracket attached to 12. (Figure 6a, 6b, 6c). At the end of 4weeks, extrusion of fractured tooth was achieved, and the fracture line was supragingival on the palatal aspect.

At this stage, circumferential supracrestal fibrotomy was performed for prevention of relapse[9]. It was stabilized for 8weeks and supracrestal fibrotomy was repeated to prevent relapse. The bone and periodontal healing were evident within 8weeks. After 8weeks the horizontal wire and bracket were removed (Figure 7a, 7b).

Post space was prepared with rotary instruments. (Figure 8). Fiber post was cemented with dual cure multi core composite resin. (Figure 9,10) The tooth was then prepared and finally restored prosthetically with an all-ceramic crown. (Figure 11,12).

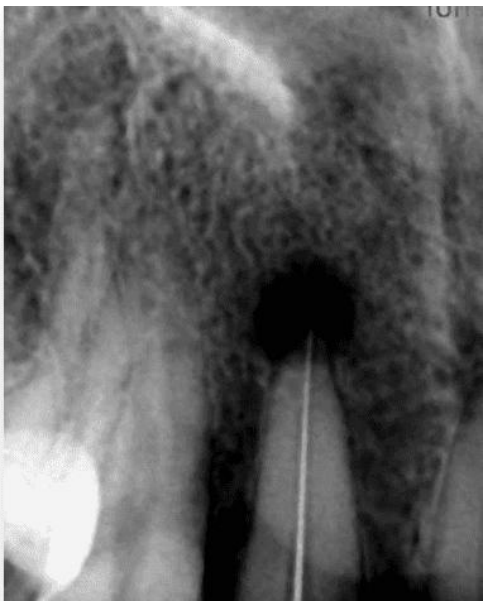

Figure 4 Working length determination

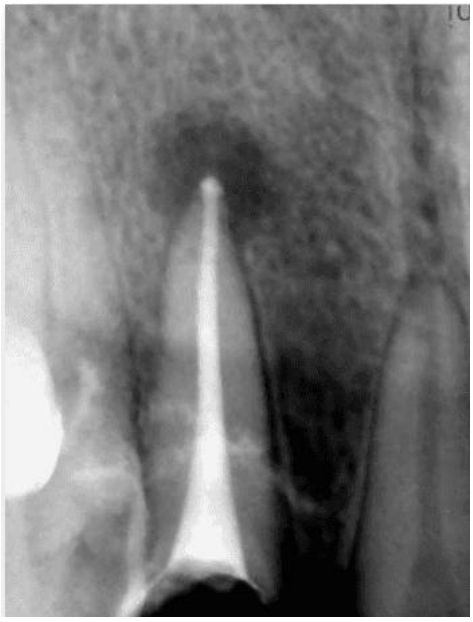

Figure 5 Obturation

Figure 6a Fixed orthodontic appliances for extrusion of 12

Figure 6b Fixed orthodontic appliance for extrusion of 12

Figure 6c Fixed orthodontic appliance for extrusion of 12

Figure 7a After 8 weeks

Figure 7b After 8 weeks

Figure 8 Post space preparation

Figure9 Fiber post placement

Figure10 Post cementation

Figure 11 Tooth preparation for Allceramic crown

Figure 12 All ceramic crown cementation

DISCUSSION

Once the crown fracture occurs several factors should be evaluated such as extent of fracture, remaining crown structure and biologic width. Unless the tooth is prosthetically rehabilitated it cannot withstand the functional forces. To provide a good restoration, it is imperative to expose the margins of the fracture tooth in cervical tooth fractures extending subgingivally below the gingival attachment or alveolar bone crest [10]. Biological width may be violated if the final restoration margin is not placed on the tooth structure, leading to restorative failure. In this case, two factors have been addressed, fracture margin access with possibility of having a tight seal with restoration and maintenance of biologic width. An interdisciplinary approach for aesthetic and functional rehabilitation is necessary for the treatment of these cases.

There are several options for treatment of such crown fractures such as crown lengthening, surgical extrusion, orthodontic extrusion and extraction. Crown lengthening removes alveolar bone leading to pocket formation. Surgical extrusion is more traumatic and may damage the crown structure during extrusion. Extraction is against the conservative approach of saving the tooth. Hence orthodontic extrusion was considered as treatment option for the present case though the treatment duration is longer comparatively.

Orthodontic extrusion, (forced eruption or assisted eruption), may serve as an alternative treatment modality if the fracture line extends subgingivally and the apical root segment has sufficient length. The main objective of orthodontic extrusion is to maintain the biological width, place the restoration (crown) margins supragingivally to obtain an aesthetic outcome.[11]

The selection of patients is an important aspect when considering orthodontic extrusion as the treatment option. The dentist must evaluate the ultimate position of the teeth being extruded, root length and anatomy, gingival contour line and gingival clearance when smiling, periodontal status, aesthetic appearance of the site, occlusion over jet and overbite, type of anchorage, amount of orthodontic forces and post-operative complications [10]. If any of these factors is inadequate, the treatment rendered becomes inappropriate.[12]

Slow extrusion has been performed with application of 25-35gm of force as rapid extrusion leads to resorption of bone. Unlike slow orthodontic extrusion, rapid orthodontic extrusion involves stretching and readjusting the periodontal fibers without marked bone remodeling. Hence slow extrusion is preferred.[13]

Orthodontic extrusion can also be done using a J-Hook placed in the canal but cementation of j hook is difficult which may get dislodged during the extrusion process. Hence orthodontic extrusion has been planned with fixed appliance and force has been applied for slow extrusion. Contraindications of orthodontic extrusion are ankylosis or hypercementosis, vertical root fracture, dilacerated roots, inadequate remaining root length, root proximity and premature closure of embrasures. [13]

CONCLUSION

Orthodontic extrusion is a conservative, straightforward method for restoring teeth without compromising the support of surrounding periodontal structures. The aesthetic appearance of the tooth is also maintained without any negative change in the length of the clinical crown. [14, 15]

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