ORIGINAL RESEARCH PAPER VOLUME-6 | ISSUE-8 | AUGUST - 2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

NOVEL MANAGEMENT OF A COMPLICATED CROWN-ROOT FRACTURE: A CASE REPORT

Dental Science

Dr.Anup Bhaisare Ex -Assistant Professor, Department of Dentistry, Shree Vasantrao Naik Government Medical College and Hospital, Yavatmal

Dr.Ashwini Patil Assistant Professor, Department of Conservative Dentistry and Endodontic, Government Dental College and Hospital Aurangabad - Corresponding Author

Dr.Manjusha Warhadpande Professor and Head of Department, Department of Conservative Dentistry and Endodontic, Government Dental College and Hospital Nagpur

ABSTRACT

Esthetical rehabilitation of fractured anterior teeth is one of the greatest challenges to a dentist. Coronal tooth fractures are most common in anterior teeth, especially in maxillary teeth due to their anatomical position. Oblique crown-root fractures are rare and often need complex treatment planning and diagnosed through clinical and radiographic examination. Treatment depends on the position of the fracture, the extent of root involvement, correct diagnosis, clinical management, and radiographic follow-up .They create serious esthetic and psychological problems for the patient.. This case report describes the clinical procedures involved in the novel management of oblique crown-root fracture in maxillary right central incisor which were restored by fibre post and core. After a 1 year of follow-up, there was no evidence of apical periodontitis and the tooth was satisfactory both esthetically and functionally.

KEYWORDS:

Fibre Post Core, Oblique Crown-Root Fracture, Traumatic Dental Injuries, Maxillary Central Incisior.

INTRODUCTION

Traumatic injuries occur more commonly in young patients and vary in severity from enamel fracture to avulsions. Among dental trauma root fracture are relatively common and comprise 0.5 to 7% of all injuries affecting permanent dentition. [1]

A crown-root fracture is a type of dental trauma, generally consequential from horizontal impact, which involves enamel, dentin and cementum, occurs below the gingival margin and may be classified as complicated or uncomplicated, depending on whether pulp involvement is present or absent [1]. Root fracture are commonly seen in maxillary central incisor and more frequently at the middle third of the root followed by apical & coronal third fracture[4]. Intraalveolar root fracture present as either horizontal (also called transverse) or diagonal (also called oblique) or vertical.

Diagnosis of root fracture is accomplished by clinical & radiographic examination. Clinical examination includes the evaluation of mobility, the presence or absence of tenderness & pain to palpation of the soft tissues, percussion of the teeth & pulp testing. Two or three radiograph taken at various angle may be needed because of the angulation of the fracture.

Several factors may influence the type of healing includes the stage of root development, mobility and dislocation of the coronal fragment & diastases between fragments. Treatment of complicated crown root fractures is often challenging due to difficulty in achieving isolation with a rubber dam for a dry operating field, which might comprised the hermetic seal . Several therapeutic procedures can be indicated to treat teeth with complicated crown-root fracture, depending on fracture location [2]. Treatment options of a subgingival or infraosseous fracture include orthodontic or surgical extrusions, gingivectomy and osteotomy and intentional replantation [3].

Although the outcome of a root fracture is generally favourable (60–80% cases), complications such as pulpal necrosis, radicular resorption and pulp canal obliteration can arise. Therefore, after performing the adequate clinical management, following up the patients for clinical assessment of treatment success is crucial.

This case report describes the novel management of oblique crown-root fracture in maxillary right central incisor restored by fibre post and core.

CASE REPORT

A 28 year old female patient reported to the Department of Conservative dentistry & Endodontic with a chief complaint with a history of dental trauma to her upper front tooth a day before following a fall. Her medical and dental histories were unremarkable. She complained of throbbing and continues pain of the traumatized tooth and was unable to eat properly. On clinical examination, Teeth 11 showed complicated oblique crown-root fracture with shattered crown. Clinical and radiographic maxillofacial examination revealed that there was no fracture of the maxilla or mandible or other facial bones. Intraoral periapical radiographic investigation (Figure 1) revealed loss of coronal tooth structure and presence of an oblique crown-root fracture on the right central incisor.

With respect to teeth 11, the fracture line extended below CEJ and alveolar crest and an oblique fracture of the palatal portion that extended from the incisor edge of 11 to 4mm subgingivally on the palatal aspect. Clinical and radiographic examinations were suggestive of complicated oblique crown root fracture of 11 that involved the enamel, dentine, pulp and cementum (Figure 1). The patient were informed regarding the various treatment options with their respective advantages and disadvantages. Treatment plan was root canal therapy with 11and intraradicular stabilization using fibre post. With parental consent, 11 was anaesthetised with local anaesthetic solution

21 was isolated with rubber dam. The pulpal tissue from the root canal was extirpated with barbed broach and the canal was irrigated with physiological saline and dried with paper points. size 25, K file was used to estimate the working length (17mm), from the upper most edge of the remaining coronal fragment. The working length was determined with an electronic apex locater (Root ZX, J.Marita Corp. Kyoto, Japan) and confirmed with radiography. The root canal was enlarged to ISO size 60 at working length. 2.5% Sodium hypochlorite was used during the preparation. The root canal was dried with paper points (Spident, Hand Rolled, Korea) and obturated using endodontic sealer (AH Plus sealer) and gutta purcha with lateral condensation. Clinical crown lengthening procedure was done using laser (Diode) assisted gingivectomy. The guttapercha was partially removed leaving the apical 5mm of the filling to maintain a good seal and An Apically positioned flap (APF) with osseous reduction was performed since the labial gingiva was inflamed and sealed with resin modified GIC. Selected prefabricated fibre post was luted into the root canal dual cure resin cement (Luxacore, DMG) [figure 3d]. followed by a composite core build up. The flap was positioned apically using vertical mattress sutures and periodontal dressing was placed. After 1 week of clinical crown lengthening surgery, crown preparation was done for metal ceramic restoration.

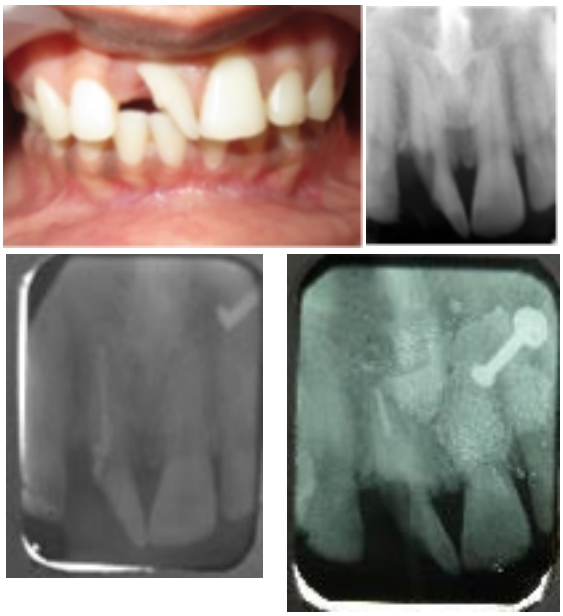

figure 1 a Preoperative intraoral view clincal photograph.
1b Properative intraoral periapical radiograph.

Figure 2 a) Post-obturation radiograph with 11
b) Fiber post trial radiograph.

Final impressions were made with two stage impression technique using putty and light body elastomeric impression material. A temporary crown was cemented on the same appointment. The finished final restoration was cemented with glass ionomer luting cement after three days (Figure 3d). Follow up was done after 1year (Figure 4e) with no evidence of any periapical pathosis and the treated tooth was satisfactory both esthetically and functionally.

Discussion:

Dental traumas due to crown-root fracture are rarely seen when compared to crown fractures (Marcenes et al., 1999; Bastone et al., 2000). It is even rare to see a complicated crown –root fracture. Complicated crown-root involves tooth structures such as enamel, dentine, cementum and pulp. The severity of presentation also varies depending on the strength of the impact force and its vector (Glendor et al., 2007). Some cases may present as vertical crown root fracture, oblique crown-root fracture or with multiple crown- root fractures. Success oftreatment of complicated crown –root fracture is generally based on the degree of impact of the trauma to the tooth supporting structures especially the periodontium, root-crown length ratio and extent and complexity of the fracture.

Figure 3 a) Placement of glass fibre post with 11,
b) Composite build up with 11,
c) Tooth preparation with 11,
d) Post operative clinical photograph and radiograph showing metal ceramic crown with 11,
(e) Follow up radiograph after 1 year.

The alternative treatment modalities of crown root fractures are fragment reattachment, orthodontic extrusion or surgical extrusion, crown lengthening procedures. Bonding the coronal fragment to the root structure can be a permanent treatment in some cases, but in the present case the subgingival location of the fracture line along with the micro fractures could not allow an optimal sealing.

In the present case, the fracture line was found to be extending 4mm subgingivally on the palatal aspect, which encroached into the biologic width. Endodontic treatment was initiated to extirpate the pulp tissue. [6]. Clinical crown lengthening is a periodontal respective procedure, it has been categorized as aesthetic or functional. It involves various techniques, including gingivectomy, apically positioned flap procedure, which may include osseous resection [7].

Gingivectomy is a simple and rapid method and allows the restorations to be completed soon after the injury [8]. It is often necessary to remove thesupporting bone from around a tooth to achieve adequate distance between the alveolar crest and the margins of the restoration The fractured area of tooth that lies subgingivally was replaced with glass ionomer cement up to the free gingival margin. This was carried out to prevent ingrowth of gingiva into the fractured region and also to allow healing of healthy periodontal cuff around the fractured region. Glass ionomer cement was used because it can tolerate small amount of moisture contamination from cervicular fluid and it is less likely to cause gingival irritation. One of the main problems with complicated crown-root fracture is the relationship of the fracture line to the alveolar crest. Extension of the fracture line sublingually may have an effect on the periodontal status and the survival of post-trauma restoration if it encroaches into the biologic width.

In this case , although the fracture line has extended subgingivally, there was no evidence of periodontal pocketing on the palatal aspect was found during subsequent follow-up period. The periodontium has healed well around the glass ionomer cement placed to replace missing tooth structure. In case of oblique crown-root fractures, the fracture line begins a few millimeters incisal to marginal gingiva facially, then progressing obliquely below the gingival crevice lingually.In the present case, teeth with11, to convert subgingival fracture line to supragingival, periodontal surgery (crown lengthening) was performed on palatal aspect to achieve predictable and faster results.

In the present case with a complicated oblique crown root fracture with pulp exposure the techniques for reestablishment of the biological width have been proposed followed by a restorative treatment indicated according to the remaining dental structure. The cementation of aesthetic posts in the root canal permits the construction of direct cores which facilitates tooth restoration. This report provides a highly conservative approach that combines esthetics, function and health of the periodontal tissues(6).

Conclusion

Oblique crown-root fracture pose difficulties for dentists to establish adequate treatment plans because these fractures require multidisciplinary approach for proper treatment planning and good prognosis as they are accompanied by emotional factors on the patient part. Adopting appropriate treatment strategy of using fibre post and core to restore crown fractures and using material, like light cure GIC, for treatment of complicated oblique crown root fracture can result in optimum healing and prolonged retention of the teeth, which would otherwise require extraction thus saved and restored through the use of a collaborative approach.

References

1. Andreasen JO, Andreasen FM. Textbook and color atlas of traumatic injuries to the teeth.4th ed. Oxford: Blackwell; 2007
2. Sandra Rivera ; "Clinical Management of a Complicated Crown-Root Fracture: A Case Report" Braz Dent J (2011) 22(3): 258-262.
3. Artvinli LB, Dural S. "Spontaneously healed root fracture: report of a case." Dent Traumatol 2003;19:64
4. Andrade ES, de Campos Sobrinho AL, Andrade MG, Matos JL. "Root healing after horizontal fracture: a case report with a 13-year follow up. "Dent Traumatol 2008;24:1-3.
5. S. Nagarajan M.P. Sockalingam ; "Complicated crown root fracture treatment option: a case report "Archives of Orofacial Sciences (2009), 4(1): 25-28
6. S. Datta Prasad ;"Multidisciplinary Approach to the Rehabilitation of a Tooth with a Complicated Crown Root Fracture: A Case Report"; imperial journal of interdisciplinary research Volume 3 issue 4;2017
7. Sahana DS;" Management of Horizontal and Multiple Crown-Root Fractures "World Journal of Dentistry, October-December 2011;2(4):338-341