TREATMENT OF MIDDLE THIRD ROOT FRACTURE BY INTRARADICULAR SPLINTING WITH FIBER POST

Anjali Sharma[1], Rohit Sharma[2], John Johnson Panadan[3], Madhurima Sharma[4]

Assistant Professor[1], Professor[2,4], PG Student[3]
1,2,3- Department of Conservative Dentistry and Endodontics,
4-Department of Prosthodontics and Crown and Bridge Teerthanker Mahaveer Dental College & Research Centre, Moradabad U.P

Abstract

Root fractures are not common in permanent teeth. The rate of dental trauma is only 0.5-7%. It mostly occurs in the permanent teeth which are erupted fully, where the roots are fully formed and have closed apices that are supported by the periodontium. This trauma can lead to serious consequences like damage to periodontium, cementum, bone, dentine and pulp. They results due to horizontal impact and are transverse to obliquely direct. Mid third fractures of the root are the most common of all the fractures encountered. 2 persons with mid-third horizontal fracturesof root in upper lateral and central incisors are discussed here. After doing the root canal treatment (RCT), the fractured root was united by using glass fiber post. After finishing the treatment, metal ceramic crowns were placed on incisors. After 2 year follow up, the stabilized root parts and the post were observed

Keywords: Fiber Splint; Glass Fiber Post; Healing; Horizontal Root Fracture; Intraradicular

1.INTRODUCTION

Root fracture is the most severe dental injury.[1] Frontal forces forms zone of compression on the palatal or labial part of the root. Root fractures can be encountered on the upper, middle and lower third. Horizontal root fractures are classified into oblique or transverse, incomplete or complete and multiple or single.[2] Apical root fractures have better prognosis than middle followed by coronal third. radiographic and the clinical evaluation techniques.

The outcome of treatment depends upon multiple factors like location of fracture, the time difference between trauma and treatment, type of trauma like whether the fractured segment is displaced or undisplaced, degree of dislocation and the stage of root formation.

If the coronal portion is displaced, it can be re-positioned, later on stabilized to promote healing of gingiva, alveolar bone, cementum and PDL (Periodontal Ligament).[3] Andreasen and Hjorting had informed about

four kind of healings: 1) healing with emergence ofcalcified tissue, 2)healing with emergence of interproximal connective tissue (C.T) and bone, 3) healing with emergence of interproximal connective tissue , 4)Non healing by emergence of inflammatory connective tissue.[4]

This study informsabout the non-surgical treatmentapproach for horizontal fracture of the tooth in upper central and lateral incisor.

2. CASE REPORTS

CASE 1

An 18-yearfemale came to our department, having complaint of mobility inher upper front tooth since one month. The patient said that she had an accident while running. Extra oral examination revealed nothing significant. On intraoral inspection, grade II mobility was encountered in 11. A radiolucent line was observed in intra oral peri-apical radiograph in middle third depicting horizontal fracture of the root in the middle third (Figure 1). EPT, heat test and cold test have given positive results.[5]

By using L.A (local anaesthesia), repositioning of the upper part of the tooth was done by using light digital pressure. Ribbond fiber splinting of the tooth was done. Patient was advised not to chew anything from tooth and was put on analgesics for 4 weeks. 4 weeks later patient returned to the department with pain in relation to 11 but EPT, cold and heat tests were negative that denotes pulp necrosis. Hence, RCT (Root canal treatment) with sectional obturation technique was done. AH plus along with G.P (Gutta percha) was utilized for obturation. 1 week later post placement was done. Self-etch was placed, light cured, followed by bonding agent placement and curing of light. This was followed by dual cure composite application. Tooth mobility was checked after 3 months. The mobility was in physiologic range. Therefore, the splint was removed. After 2 year follow up period the tooth was radio graphically and clinically examined. The patient was not having any features of root fracture.

(a)

(b)

(c)

(d)

(e)

(f)

Figure1: (a) Preoperative Photograph. (b) Preoperative radiograph showing middle third root fracture. (c) Sectional Obturation. (d) Post and core placement. (e) Tooth preparation. (f) Metal ceramic crown placement

CASE 2

A man of 27 year age came to our department having history of trauma four months prior and complaint of mobility in his upper front tooth (lateral incisor - 22). EPT was negative in tooth. On examination of radiograph, mid third horizontal root fracture was encountered. Front tooth extraction can result in poor aesthetics. Hence, splinting by fiber splint was done followed by root canal treatment and intraradicular fibre post placement (Figure 2). Patient consent was taken. Ribbond fiber splint was taken out after four weeks and the patient was put on follow up. The patient reported after 2 year with no signs and symptoms of root fracture.


(a)


(b)


(c)


(d)

Figure2: (a) Preoperative Photograph. (b) Fibre Splinting. (c) Fiber Post Placement. (d) 2 year follow up

3. DISCUSSION

Natural dentition preservation and restoration of occlusion to normal function is the basic goal of dentistry. Replacement with implants and extraction should be considered as the last resort, after all other options has been tried. Root fractures can occur when trauma occurs on the face due to direct blow on face, running and playing sports. 80% of injuries in dental clinics are encountered in upper central incisors, followed by upper lateral incisors and lower incisors.[6] The fracture communicating to the oral cavity, can lead to microbial contamination. Thereby, leads to pulpal necrosis. Treatment of root fractures involves the following specialities like Endodontic, Periodontics, Orthodontics and also Prosthetic treatment.[7,8]In cases of middle third horizontal root-fractures first reposition the fragments then confirm its location radiographically.

Andreasen and Hjorting had informed about four kind of healings:

1)Healing with emergence ofcalcified tissue- here the fragments are located in close contact but fracture line is seen radiographically,

2)Healing with emergence of interproximal connective tissue (C.T) and bone- here the fracture line is rounded and separated when seen on radiograph,

3) Healing with emergence of interproximal connective tissue- fracture lines here are seen separated by bony bridge in radiograph.

4) Non healing by emergence of inflammatory connective tissue- radiographically increasing space between the fracture line is seen.[4]

In cases with root fracture, immediate treatment is required with splinting for 2 to 4 months period.[9]. In our case, we use fiber splint and intra radicular fibre post to stabilize the coronal fragment. The fiber splint was kept for four weeks' time period. Repositioning of the fractured part, root development and pulpal sensitivity are more important than the time period required for splinting.[10]The success of middle third root fractures is dependentupon the displacement of root fragments, occlusion, health of the patient and state of pulp tissue.

4. CONCLUSION

"Tooth structure preservations and bringing it to normal function" is the most important objective of dentistry. Root fractures can be successfully treated using fibre post and dual cure cements. Intra radicular fibre splints with fiber splinting can be used for successfully treating root fractures.

REFERENCES

1. Agrawal N, Varghese R K , Tiwari M , Sharma A. Endodontic management of middle third root fracture of upper lateral incisor with glass fiber post & core endodontic restoration: A case report. IP Indian Journal of Conservative and Endodontics. 2021; 6(1): 44-48. https://doi.org/10.18231/j.ijce.2021.010
2. Chute A K, Toshniwal A, Gade V and Chute M. Repair of incomplete horizontal mid-root fracture of maxillary central incisor with mineral trioxide aggregate:A follow up report. J Conserv Dent. 2014; 17(4): 393–395.https://dx.doi.org/10.4103%2F0972-0707.136521
3. Ismail PM, Baby D, Sreedevi PV, Rajeev KG, Gautham A, Babita T et al. Management of Horizontal Root Fracture with Intraradicular splinting using glass fiber post and biodentin: A Case Report. IOSR J Dent Med.

4. 2020;19(9):59–63.https://doi.org/10.18231/j.ijce.2021.010
5. 4.Giudice RL, Lizio A,Cervino G,Fabiana N,Francesco P,Ausiello P and Cicciù M. The Horizontal Root Fractures. Diagnosis, Clinical Management and Three-Year Follow-Up. Open Dent J. 2018; 12: 687–695. 10.2174/1745017901814010687
6. Roig M, Espona J, Mercadé M and Duran-Sindreu F. Horizontal root fracture treated with MTA, a case report with a 10-year follow-up. Dent Traumatol 2011;27:460-463.http://dx.doi.org/10.1111/j.1600-9657.2011.01018.x
7. Zerman N and Cavalleri G. Traumatic injuries to permanent incisors. Endod Dent Traumatol. 1993 Apr;9(2):61-64. doi: 10.1111/j.1600-9657.1993.tb00661.x. PMID: 8404697.
8. Andreasen FM, Andreasen JO and Bayer T. Prognosis of root-fractured permanent incisors – Prediction of healing modalities. Endod Dent Traumatol. 1989;5:11-22. https://doi.org/10.1111/j.1600-9657.1989.tb00331.x
9. Gabris K, Tarjan I and Rozsa N. Dental trauma in children presenting for treatment at the Department of Dentistry for Children and Orthodontics, Budapest, 1985-1999. Dent Traumatol. 2001;17:103-108.https://doi.org/10.1034/j.1600-9657.2001.017003103.x
10. Kahler B, Hu J Y, Smith C S M and Heithersay GS. Splinting of teeth following trauma: a review and a new splinting recommendation. Australian Dental Journal. 2016; 61:(1 Suppl) 59–73. https://doi.org/10.1111/adj.12398
11. Vaswani S, Abraham S, Najan H B and Karad RR. Conservative Management of the
12. Horizontal Root Fracture in the Middle Third using Fiber Post as an Intraradicular Splint.Macedonian Journal of Medical Sciences.2020;8(C):146-150. http://dx.doi.org/10.3889/oamjms.2020.4865

How to cite this article: Sharma A, Sharma R, Panadan JJ, Sharma M. Treatment of middle third root fracture by intraradicular splinting with fiber post. TMUJDent2022;9(4):11-16.