ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 4, Issue – 2, April - 2021, Page No. : 31 - 35

Use of an intra-radicular post in conjunction with MTA for the treatment of Horizontal root fracture: A Case Report

[1]Dr. Vibha Gupta, Post-graduate student, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar

[2]Dr. Shantun Malhotra, Reader, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar.

[3]Dr. Kanwalpreet Kaur Bhullar, Professor and Head Of Department, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar.

[4]Dr. Rupam Kaur, Reader, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar.

Corresponding Author: Dr. Vibha Gupta, Post-graduate student, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar

Citation of this Article: Dr. Vibha Gupta**,** Dr. Shantun Malhotra, Dr. Kanwalpreet Kaur Bhullar**,** Dr. Rupam Kaur, "Use of an intra-radicular post in conjunction with MTA for the treatment of Horizontal root fracture: A Case Report", IJDSIR- April - 2021, Vol. – 4, Issue - 2, P. No. 31 – 35.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

An injury can be defined as an interruption in the continuity of tissues and healing as the reestablishment of that continuity. Radicular fractures in permanent teeth are uncommon injuries and account for only 0.5–7% of dental traumas. These fractures commonly result from a horizontal impact and are transverse to oblique in direction. Their incidence is more in the middle third of the root than at the apical and cervical thirds The objective of this case report is to reinforce the fractured segments using fiber post as an intra-radicular splint. A one-year follow-up revealed patient is asymptomatic and a well stabilized assembly of the root fragments and the post.

Keywords: Mid root fracture, Intraradicular splint, Fiber post, Mineral Trioxide Aggregate (MTA).

Introduction

Among all dental traumatic injuries, root fractures account for only 0.5–7% [1], could be defined as "fracture involving dentin, cement and pulp"[2]. Horizontal root fracture most commonly occurs in the middle third of the root and very rarely in the coronal and apical third[3]. Maxillary central incisors are more prone to traumatic injuries (approximately 68%) probably due to their position in the dental arch. The next in line are the maxillary lateral incisors (27%) followed by mandibular incisors (5%)[4].

The initial treatment consists of repositioning of the displaced segments, followed by stabilizing of the tooth to allow the healing of periodontal ligament supporting the segments. The amount of dislocation and the degree of mobility of the coronal segment affects the prognosis outcome. Achieving stable fracture reduction is inversely proportional to the severity of dislocation, mobility, and pulpal injury[5]. It had been noted that if the displacement between the fragments in minimal, intracanal stabilization can improve the prognosis of the treatment[6].

Case Report

A patient of 42 years male was reported to the department of Conservative Dentistry and Endodontics in Sri Guru Ram Das Institute of Dental Sciences and Research, Sri Amritsar with the chief complaint of extruded maxillary central incisors, 2 hours ago, due to injury while playing a sport. The medical history was non-contributory.

On clinical examination, extrusion of maxillary central incisor was noticed (Figure 1) because of that, no posterior occlusal contacts were present. Periapical radiographs revealed fracture at the middle third of root of tooth # 11 (Federation Dentaire Internationale) separating the coronal and apical root fragments from each other by about 2-3 mm (Figure 2). There was no significant bone loss.

The treatment plan comprised of reduction and splinting of the coronal fragment of tooth; followed by an endodontic treatment and placement of fiber post as an intraradicular splint. Patient was informed about the treatment and informed consent was taken. Splinting was carried out from tooth # 12 to 21 with co-axial wire and light cure composite resin [Figure 3(a) and 3 (b)].

After rubber dam application, access opening was achieved under local anesthesia and working length was estimated with a size 15 K-file (Figure 4). The 10 K-file was precurved so as to engage both the fragments of the fractured root. Pulp tissue was extirpated and the canal was irrigated with saline. Cleaning and shaping of the canal was done by conventional method using 2% K-files in a step back manner to an apical file size of #45. An intracanal $Ca(OH)_2$ dressing was given and cavity was sealed with zinc oxide eugenol cement.

During the next appointment, an apical barrier of approximate 4mm was made with the MTA (Figure 5). Appropriate glass fiber posts were tried into the canal, adjusted to the desired length until they just passively touched the apical barrier of MTA. The fiber post was luted into the canal with dual cure resin cement and access cavity was restored with composite resin cement (Figure 6).

After one year of recall, the patient presented with aesthetically pleasing results and sound periodontium and the fractured root fragments were well retained with the aid of a post (Figure 7).

Discussion

Root fracture can be a consequence of dental trauma causing a complex injury to the cementum, dentin, pulp, and the periodontal tissues. Such injuries can occur due to road accidents, violence, sport injuries, and so forth. Maintaining “the physiological and functional integrity” is the main goal while treating traumatized teeth.

Four types of conservative endodontic treatment that have been commonly described are (i) cleansing and gutta percha (GP) filling of the root canal of the coronal fragment only; (ii) cleansing and filling of the root canal in both fragments; (iii) cleansing and GP filling of the root canal of the coronal fragment and surgical removal of the apical fragment; and (iv) treatment of the root canal with calcium hydroxide followed by filling with GP[7].

Recently, different types of post materials have been introduced into the dental practice such as carbon fiber, quartz, and glass fiber. The fiber posts offer several advantages such as a suitable elastic modulus, aesthetics,

good bonding between post and cement, lower chair side time, and minimal tissue removal[8]. According to Gurtu and Singhal[9], the use of a post ensures support and stability to the tooth. It also helps to retain the root fragments by radicular anchoring thereby strengthening the restoration complex which is subjected to tangential stresses. Post placement, in addition to bonding, provides retention via a friction bond and assists in preventing dislodgement to nonaxial forces.[10]

In the present case report, MTA was used as an apical barrier. With the availability of MTA™, it is possible to induce regenerative tissue formation at the fracture line. MTA has been widely used in the recent years for pulp capping, partial pulpotomy, perforation repair, resorption repair, repair of fracture, root end filling, apical barrier for tooth with necrotic pulp and open apex , coronal barrier for regenerative endodontics , root canal sealer.[11]

Midroot fractures can heal by different mechanisms. Andreasen and Hj¨orting-Hansen described four types of healing sequelae: (1) healing with calcified tissue, (2) healing with interproximal connective tissue, (3) healing with interproximal bone and connective tissue and (4) interproximal inflammatory tissue without healing[12].

Incidence of complications after traumatic dental injuries were studied by Kallal I et al[1], as: external root resorption was present in 70% of cases, surface resorption was observed in 10% of cases, and replacement resorption in 10%, ankylosis in 10%. About pulpal complications, pulp necrosis was found after 4 weeks of follow-up, as well as the internal root resorption after one year. In present case report, after one year, surface resorption had been seen at fracture site. It had been reported that this appears to be self-limiting and does not threaten the retention of tooth[13].

A long-term follow-up is required to check for any possible pathological alterations. Follow-up of this case after one year showed promising results with clinically pleasing aesthetics and radiographic healing with calcified tissue, the fractured line was discernible but fragments were well stabilized.

Conclusion

"Preservation of natural dentition and restoration of the oral cavity to a normal functional state" is the primary goal in dentistry. The main aim of treating fractured elements is to keep the tooth steady and maintain its position in the dental arch whenever possible. Intraradicular splinting using fiber posts can be a good alternative for managing midroot fractures and reestablishing the aesthetics and functional needs of the patients.

References

1. Kalel I, douki N, amaidi S. The Incidence of Complications of Dental Trauma and Associated Factors: A Retrospective Study. International Journal of Dentistry. Volume 2020, Article ID 2968174.
2. F. M. Andreasen and J. O. Andreasen, "Crown fractures," in Textbook and Color Atlas of Traumatic Injuries to the Teeth, pp. 219–256, Munksgaard,Copenhagen, Denmark, 3rd edition, 1994.
3. C. M. Bramante, R. Menezes, I. G. Moraes, N. Bernardinelli, R. B. Garcia, and A. Letra, "Use of MTA and intracanal post reinforcement in a horizontally fractured tooth: a case report," Dental Traumatology, vol. 22, no. 5, pp. 275–278, 2006.
4. E. S. Andrade, A. L. P. D. C. Sobrinho,M.G. S.Andrade, and J. L. F.Matos, "Root healing after horizontal fracture: a case report with a 13-year follow up," Dental Traumatology, vol. 24,no. 4, pp. e1–e3, 2008.
5. J. R. Molina, W. F. Vann Jr., J. D. McIntyre, M. Trope, and J. Y. Lee, "Root fractures in children and

adolescents: diagnostic considerations," Dental Traumatology, vol. 24, no. 5, pp. 503–509, 2008.

6. Sumita BA. Use of MTA in conjunction with intraradicular endodontc file splint for horizontal bone fracture: A case report. AOHDR; 1(1): 2017;p:1-4
7. M. Cvek, "Treatment of non-vital permanent incisors with calcium hydroxide. IV. Periodontal healing and closure of the root canal in the coronal fragment of teeth with intra-alveolar fracture and vital apical fragment. A follow-up," Odontologisk Revy, vol. 25, no. 3, pp. 239–246, 1974.
8. Ismail PM, Deepak Baby, Sreedevi PV, Rajeev KG, A Gautham, Babitha Thomas .Management of Horizontal Root Fracture with Intraradicular splinting using glass fiber post and biodentin: A Case Report. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). Volume 19, Issue 9 Ser.2 (September. 2020), PP 59-63
9. A. Gurtu and A. Singhal, "Management of horizontal fracture," Journal of Dental Sciences and Oral Rehabilitation, pp. 48–50, 2012.
10. A. Polesel, "Restoration of the endodontically treated posterior tooth," Giornale Italiano di Endodonzia, vol. 28, no. 1, pp. 2–16:2014.
11. Bhagwat SA, Hegde S, Mandke LP. An investigation into the effectiveness of periapical surgery with BiodentineTM used as a root-end filling alone or in combination with demineralized freeze-dried bone allograft and plasma rich brin: A 6 months follow-up of 17 cases. Endodontology 2016;28:11-7.
12. J. O. Andreasen and E. Hj¨orting-Hansen, "Intraalveolar root fractures: radiographic and histologic study of 50 cases," Journal of Oral Surgery, vol. 25, no. 5, pp. 414–426, 1967.
13. K. C,jahskan MK, Pefilivan Y. Prognosis of root-fracttued permanent incisors. Endod Dent Traumatol 1996; 12: 129-136.

Legend Figures

Figure 1: pre-operative photograph

Figure 2: pre-operative radiograph

Figure 3(a) and 3(b): splinting done

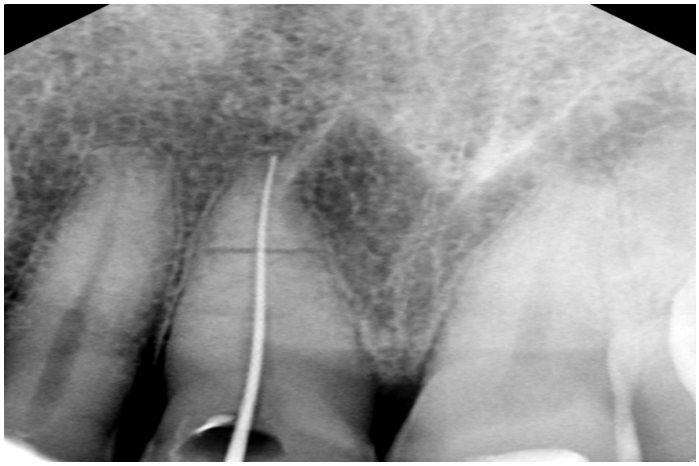

Figure 4: Working length determination

Figure 5: MTA as a barrier

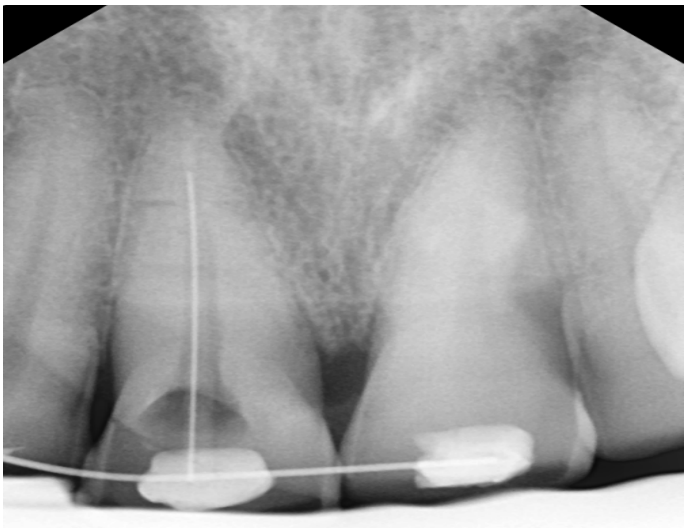

Figure 6: Luting of fiber post

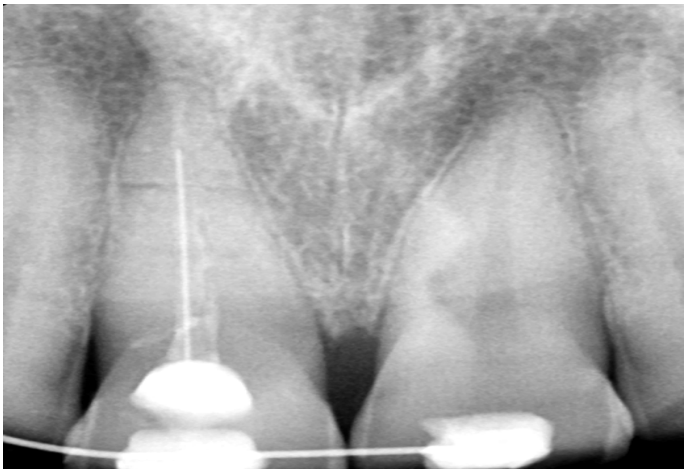

Figure 7: immediate post operative IOPA

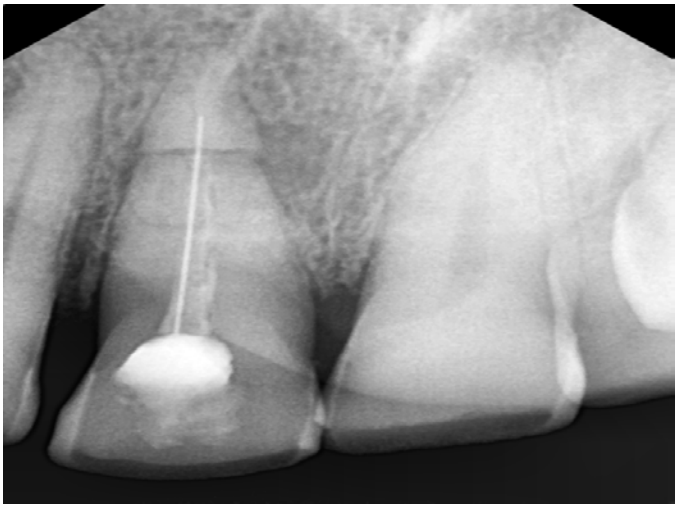

Figure 8: post-operative radiograph after one year