MAVEN eISSN: 2581-4443 | www.idahow.org

CASE REPORT

Surgical Management of Inflammatory Periapical Lesion with MTA: Two Case Reports

Annil Dhingra[1], Mayuri Kumari[2]

[1]Professor and Head of the Department, [2]Post Graduate student, Department of Conserva- tive Dentistry and Endodontics, Seema Dental College and Hospital, Rishikesh, Virbhadra Road, Uttrakhand - 249203, India.

Corresponding Author: Prof. (Dr.) Annil Dhingra, Professor and Head of the Department, Department of Conservative Dentistry and Endodontics, Seema Dental College and Hospital, Rishikesh, Virbhadra Road, Uttrakhand - 249203, India. Email id: anildhingra5000@yahoo.co.in.

Abstract

Root fractures are defined as fractures involving the dentine, cementum and pulp. They comprise 0.5 to 7% of the injuries affecting the permanent dentition and commonly occur between the age group of 11 to 20 years. Root fractures can be classified as Horizontal and Vertical. Different types of retrograde root end filling materials are available for the horizon- tal root fracture in the apical third region. Among those filling materials, MTA is the best root-end filling material. This material is almost non-resorbable and non-toxic, having bac- teriostatic properties to heal and offers a good apical seal. Histological examination showed the stimulation of cementum and hard tissue formation with minimal inflammatory re- sponse after using this hydrophilic material MTA. Here we report two cases of horizontal root fracture managed with MTA. (2019, Vol. 03; Issue 01: Page 24 - 28)

Key words: Avulsion, Horizontal root fracture, MTA, Retrograde root end filling material, Traumatic injury.

Introduction

Traumatic injuries to a tooth can vary in severity from a simple enamel infraction to a complete ex-articulation of tooth (avul- sion). Among these injuries, tooth fracture (crown fractures, crown-root fractures and root fractures) are considered to be the third most common cause of tooth loss (1). Of particular interest to clinicians (and clinically challenging) are the cases of root fractures as their management may in- volve an interdisciplinary/multidisciplinary treatment approach (2). Root frac- tures are defined as fractures involving the dentine, cementum and pulp (1). They comprise 0.5 to 7% of the injuries affecting the permanent dentition and commonly occur between the age group of 11 to 20 years (3-5). Root fractures can be broadly classified as Horizontal (transverse) and Vertical.

Horizontal root fractures are the most common type and occur mainly in the an- terior region of the maxilla in fully erupted teeth with complete root formation, owing

to a frontal impact (1, 3, 6). They occur most commonly in the middle-third and rarely in the apical and coronal-third of the root (6, 7). They show the highest chances of preservation of pulp vitality as compared to other luxation injuries (8). Another rare type of root fracture is a vertical root fracture that extends through the long axis of the root toward the apex. An interdisciplinary and/or multidiscipli- nary approach may be required for the functional and aesthetic rehabilitation of the tooth following such fractures (2, 6, 9). Horizontal or transverse root fractures are most commonly seen in young adults due to direct physical trauma in the anterior region. In the case of apical-third fractures of the root, there is usually no mobility and the tooth may be asymptomatic. Also, it has been observed that the apical seg- ment of a transversely fractured tooth re- mains vital in most of the cases. Thus no treatment is required and a watch and ob- serve policy is advocated. If the pulp un- dergoes necrosis in the apical fragment, surgical removal of the apical fragment is indicated followed by root end preparation with retrograde root end filling. ZOE Ce- ment IRM, Super EBA, cavit, zincpolycar- boxylate, zinc phosphate and glass iono- mer cements, mineral trioxide aggregate, calcium phosphate cement and bone ce- ment have also been employed for retro- fillings (6).

The most commonly used root end filling material is MTA because it provides supe- rior sealing ability when compared with Amalgam, IRM and Super EBA. MTA is the best root-end filling material. This mate- rial is almost non-resorbable and non- toxic, having bacteriostatic properties to heal and offers a good apical seal. Histological examination showed the stimula- tion of cementum and hard tissue for- mation with minimal inflammatory re- sponse after using this hydrophilic mate- rial MTA (5).

Here, we report of two cases of horizontal root fracture. We have used MTA in the ap- ical third of root to form a good apical seal in the fractured root.

Case Report 1

An 18 year old male patient came to the Department of Conservative Dentistry and Endodontics, Seema Dental College and Hospital with the complaint of pain in re- lation to the maxillary right anterior region for last 3 months. On clinical examination, there was grade I mobility (Fig 1).

Fig 1: Preoperative intraoral view

On radiographic examination, intraoral periapical radiograph of that region re- vealed a well-defined periapical radiolu- cency of about 1.1 × 1.0 cm around the apices of maxillary right central and lat- eral incisors with horizontal fracture at the root end of central incisor. Both the teeth tested responsive to thermal and electric pulp testing. There was only mild tenderness to palpation and percussion. The diagnosis was given as irreversible pulpitis with chronic apical abscess with

respect to maxillary right central and lat- eral incisors.

The treatment plan was decided as root canal therapy in the maxillary right cen- tral and lateral incisors followed by root end resection.

There is internal resorption in 11, so the MTA plug was made in 11 and obturated with lateral compaction, but 12 canal was obturated with lateral compaction, using gutta-percha points of 20 0.6% taper (Dentsply Maillefer, Ballaigues, Switzer- land) and Apexit plus (ivoclar vivadent) under rubber dam isolation, 1 day prior to the surgery. Gutta percha was extended beyond the apex to locate the extent of le- sion (Fig 2A). After effective local anesthe- sia with 2% lignocaine, bleeding points were marked (Fig 2B). After that a full- thickness Luebke Ochsenbein flap was re- flected (Fig 2C). A small defect was visible in the cortical plate with the central inci- sor, which was enlarged to aid in complete curettage of the granulation tissue (which was sent for biopsy). This was followed by irrigation with betadine (Win Medicare; Win Medicare Dental Products, New Delhi, India) and sterile saline solution. Then the extended gutta percha was cut. Root end resection was done. After that MTA was placed into the defect completely used as root end filling material in teeth (Fig 2D). The flap was repositioned and closed with 4-0 silk suture (Fig 2E & F).

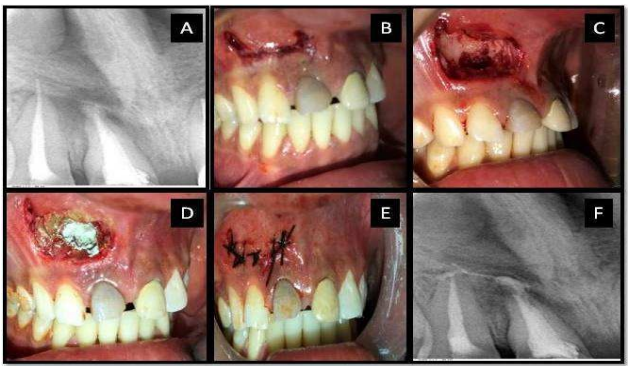

Fig 2: A- Radiographic view of obturated canals, B- Bleeding points marked, C- Flap raised, D- MTA placed, E- Suture placed, F- After surgery.

Case Report 2

A 42-year-old male patient came to the Department of Conservative Dentistry and Endodontics at Seema Dental College and Hospital, Rishikesh with the chief com- plaint of pain in his upper left front teeth since last 3-4 months (Fig 3).

Fig 3: Intraoral view

Patient gave history of trauma few days back. On vitality tests tooth was respon- sive. On palpation vestibular tenderness was evident. Tooth was tender on percus- sion and grade I mobile. Radiographic ex- amination revealed horizontal fracture of Apical third of the root with radiolucency present near the fracture site suggesting presence of granulation tissue. Apical seg- ment was displaced from its anatomical position (Fig 4A).

Root canal treatment was attempted and access cavity was restored with temporary restoration. Endodontic management of

coronal segment followed by surgical re- moval of granulation tissue and displaced apical segment was planned. Informed consent was obtained. After removal of temporary restoration, working length is taken (Fig 4B). After that master cone was selected (Fig 4C) and obturation was done with lateral compaction, using gutta-per- cha points of 20 0.6% taper (Dentsply Maillefer, Ballaigues, Switzerland) and Apexit plus (ivoclar vivadent) under rub- ber dam isolation, 1 day prior to the sur- gery (Fig 4D). Gutta percha was extended beyond the apex to locate the extent of le- sion.

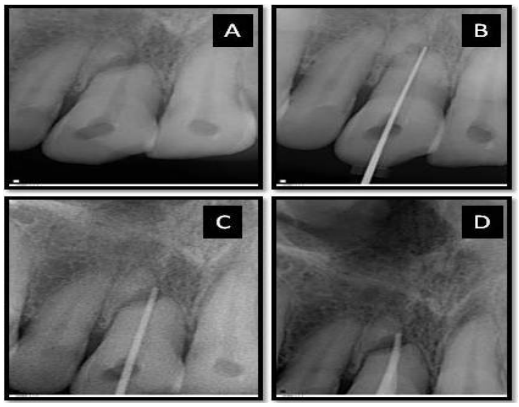

Fig 4: A- IOPA shows apical segment dis- placed from anatomical position, B- Working length taken, C- Master cone se- lection, D- IOPA shows obturated tooth.

After effective local anesthesia with 2% lig- nocaine, bleeding points were marked. Af- ter that a full-thickness flap was reflected (Fig 5A). A small defect was visible in the cortical plate with the central incisor, which was enlarged to aid in complete cu- rettage of the granulation tissue (which was sent for biopsy). This was followed by irrigation with betadine (Win Medicare; Win Medicare Dental Products, New Delhi, India) and sterile saline solution. Then the extended gutta percha was cut (Fig 5B).

Fractured root end was removed (Fig 5C) and root end resection was done. After that MTA was placed into the defect (Fig 5D) and completely used as root end filling material in teeth. Then the bone graft was placed in the defect (Fig 6A). Finally the flap was repositioned and closed with 4-0 silk suture (Fig 6B & C).

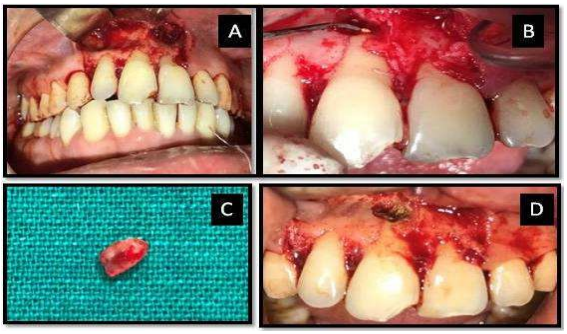

Fig 6: A- Bone graft placed, B- Suture placed, C- IOPA shows no fracture seg- ment at root end and MTA was placed in the apical region.

Discussion

Root fractures are relatively uncommon clinical condition with a frequency of 0.5% to 7% in permanent teeth (1). Although the prognosis of root fractures is generally good, histological reaction at fracture line can occur in one of the following 4 types: interposition of calcified tissue (calus for- mation), interposition of calcified and con- nective tissue, interposition of connective tissue and by interposition of granulation tissue, caused by an infected or necrotic pulp (2, 7). Though most frequent tissue reaction at the fracture line is interposi- tion of connective tissue, which occurs in almost 65% of cases (4). Interposition of granulation tissue occurs when the coro- nal segment loses its vitality and infective products in the coronal pulp cause an in- flammatory response.

MTA is biocompatible material with anti-microbial properties and high pH 12.5, which promotes growth of the cementum and formation of bone, resulting regener- ation of the PDL around the site of injury (9, 10). In the present cases, MTA was used to seal the fractured site of the root to promote healing.

Treatment approach for horizontal root fracture is complex and depends on degree of displacement of fracture fragment, pa- tient's age, stage of root growth, mobility of the coronal fragment and diastasis of the fragments. Necrotic apical segment should be removed surgically if the re- maining coronal root segment is long enough to provide adequate periodontal support (10). In our 2nd case, apical root segment along with granulation tissue was removed surgically followed by root end preparation and placement of MTA as root end filling material.

Conclusion

Management of intra alveolar root fracture with complications like calcific metamor- phosis, periodontal communication and root resorption is challenging. A tooth with non healing horizontal root fracture with granulation tissue can be treated surgi- cally by removal of fractured apical seg- ment and granulation tissue followed by placement of newer bioactive materials like MTA and techniques like retro filling, in its healthy state functionally and aes-thetically.

References

1. Andreasen JO, Andreasen FM, Anders- son L. Textbook and Color Atlas of Trau- matic Injuries to the Teeth. 5th Edition, Wiley-Blackwell; 2007: 337-371.

2. Andreasen JO, Hjørting-Hansen E. In- tra-alveolar root fractures: radiographic and histologic study of 50 cases. J Oral Surg, 1967; 25: 414-426.

3. Caliskan MK, Pehlivan Y. Prognosis of root-fractured permanent incisors. Endod Dent Traumatol, 1996; 12: 129-136.

4. Jacobsen I, Zachrisson BU. Repair characteristics of root fracture-s in perma- nent anterior teeth. Scand J Dent Res, 1975; 83(6): 355-364.

5. Andreasen JO, Andreasen FM. Root fractures. In: Textbook and color atlas of traumatic injuries to the teeth. 3rd Edi- tion, Wiley-Blackwell; 1994: 79-314.

6. Cvek M, Tsilingaridis G, Andreasen JO. Survival of 534 incisors after intra-alveo- lar root fracture in patients aged 7–17 years. Dent Traumatol, 2008; 24(4): 379–
387.

7. Majorana A, Bardellini E, Conti G, Kel- ler E, Pasini S. Root resorption in dental trauma: 45 cases followed for 5 years. Dent Traumatol, 2003; 19(5): 262-265.

8. McCabe PS, Dummer PMH. Pulp canal obliteration: an endodontic diagnosis and treatment challenge. Int Endod J, 2012; 45: 177–197.

9. Roberts HW, Toth JM, Berzins DW, Charlton DG. Mineral trioxide aggregate material used in endodontic treatment: a review of literature. Dent Mater, 2008; 24(20): 149-164.

10. Agrawal Vineet S, K Sonali. Clinical management of severe external root re- sorption and immature open apex with MTA and calcium hydroxide- A case re- port. Endodontology, 2013; 83-88.