HORIZONTAL ROOT FRACTURE IN MAXILLARY FIRST PREMOLAR: A CASE REPORT

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ABSTRACT
Horizontal root fractures of the posterior teeth are rare and occur due to severe trauma. We report herein a case of horizontal root fracture in the middle third of a two-rooted maxillary left first premolar. Since the coronal part of tooth was non-vital, calcium hydroxide was used as an intracanal medication for 10 days. Later, root canal therapy was successfully performed with mineral trioxide aggregate (MTA) and gutta-percha cones. At 3-year follow-up, the tooth was asymptomatic, and clinical and radiographic examination revealed that healing patterns.

Key words: Dental Trauma, Horizontal Root Fracture, MTA.

INTRODUCTION
Horizontal root fractures due to trauma most often occur in permanent maxillary central incisors with completely formed root.1,2 Horizontal root fractures involving the posterior teeth are generally rare, requiring a directed blow with heavy force.

When a root fractures horizontally, the coronal segment is displaced to a varying degree, but generally the apical segment is not displaced. Because the apical pulpal circulation is not disrupted, pulp necrosis in the apical segment is extremely rare. Pulp necrosis of the coronal segment results because of its displacement and occurs in about 25% of cases.3-5

Mineral trioxide aggregate (MTA) is an endodontic material that was first used as a root end filling material, but it has also been used as an alternative in several clinical procedures, such as capping of pulp tissue, root end closure, repair of furcal perforations, and orthograde filling of the entire root canal.6,7 MTA is highly biocompatible8,9 and osteoconductive, which may help the periapical tissue to adapt and heal. Its effectiveness has been shown in recent case reports.10 Most of the reported cases are related to the anterior teeth11-14.
only a few reports have involved fractured posterior teeth. The purpose of this report was to describe successful treatment of a maxillary first premolar with horizontal root fracture using MTA as a root canal sealer.

CASE REPORT

A 50-year-old female was referred to the Department of Endodontics, Faculty of Dentistry, Hacettepe University, with sinus tract complaint of the mid-buccal root side of the left maxillary first premolar tooth. The patient could not recall any serious trauma except pressure due to hard popcorn kernel one month before.

The patient reported that there was slight tenderness to percussion, and healed fistulae. The tooth demonstrated slight mobility, and responded non-vital to electric pulp test and thermal tests. Radiographic evaluation revealed a horizontal root fracture on the middle third of the left maxillary first premolar. Periapical pathology was observed in the coronal part (Figure 1).

As the coronal part of the tooth showed necrosis, the cervical fragment was treated endodontically (Figure 2). After application of the rubber dam and access cavity preparation, the number 25 K-files were inserted in the coronal part of the canals and working length was obtained by taking a radiograph. Then root canal preparation was made under irrigation with 2.5% sodium hypochlorite (NaOCl). The root canals were prepared with K-files up to no.50. The canals were dried with sterile paper points and calcium hydroxide was placed in the root canals for intracanal medication. After 10 days, the intracanal dressing was removed by rinsing with 2.5% NaOCl. The canals were dried with sterile paper points.

MTA (ProRoot™, Dentsply, Tulsa Dental, Tulsa, USA) was mixed in a 3:1 proportion and placed into the canals with lentulo and accommodated in place with fine condensers. Gutta-percha cones (no. 50) replaced both buccal and palatal canals. Later, glass ionomer cement was placed in the orifices. The access cavity was then restored with composite resin (TPH Spectrum, Dentsply, Canada).

The patient presented for follow-up at 2, 3, 6 and 12 months and yearly thereafter. At 3-year follow-up she was comfortable, with no complaints of sinus tract, edema or sensitivity. No periapical pathology development was detected on radiographs (Figure 3).
DISCUSSION

Following a root fracture, if there is no mobility or displacement of the coronal segment, the patient may have no apparent complaint and may not require dental treatment. It was reported that root fractures in 31% of the patients were identified coincidentally during subsequent dental radiographic examinations.\textsuperscript{15, 16} There have been several reports of healing of horizontal root fractures without treatment.\textsuperscript{11-13,15}

The sequelae of root fractures may be divided into four categories as: i) healing with calcified tissue, ii) healing with interproximal connective tissue, iii) healing with interproximal connective bone and connective tissue, and iv) interproximal inflammatory tissue without healing.\textsuperscript{3}

It is advisable to monitor healing for at least one year to determine pulpal status after trauma. If pulp necrosis develops, root canal treatment of the coronal tooth segment to the fracture line is indicated to preserve the tooth.\textsuperscript{17} When the coronal segment loses its vitality, the fourth type of healing pattern is typical. Interproximal inflammatory tissue without healing can occur. On radiographs, a widening of the fracture line or a developing radiolucency corresponding to the fracture line becomes apparent.

MTA is a powder consisting of fine hydrophilic particles that set in the presence of moisture. The major compounds of MTA are tricalcium silicate, tricalcium aluminate, tricalcium oxide and silicate oxide.\textsuperscript{6, 18}

In our case, the patient could not recall any serious trauma other than hard popcorn kernel pressure. We believe the tooth had already undergone serious trauma prior to this event, of which the patient was unaware. The fracture could not heal and coronal vitality was lost.

In this case, calcium hydroxide was placed in the cervical fragment as an intracanal medication for 10 days; however, MTA was used as a root canal sealer; we applied the mixture of MTA via lentulo.

CONCLUSION

The presented case of root fracture showed good prognosis. Correct diagnosis, clinical management and subsequent radiographic follow-up are essential for the success of the treatment.

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REFERENCES

CLINICAL DENTISTRY AND RESEARCH


