Case Report

Spontaneously healed horizontal root fracture in maxillary first premolar: report of a case

Çobankara FK, Üngör M. Spontaneously healed horizontal root fracture in maxillary first premolar: report of a case.

Abstract – Root fractures of the posterior teeth are rare and occur as a result of severe trauma. This study describes the horizontal root fracture of a maxillary first premolar. The fractured roots were discovered during a routine radiographic examination. The tooth was asymptomatic and responded positively to electric pulp testing. The patient reported accidental trauma, which occurred 14 years before. Our case is an example of spontaneously healed fractured roots. The interesting findings were that the healing was observed even in the presence of two roots, including preservation of the vitality of the pulp.

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Horizontal root fractures in permanent dentition have been reported to occur in 0.2–7% of all traumatic injuries to teeth (1–6). The wide range of percentages in these studies is related to differences in the surveyed populations, and therefore, precise incidence is difficult to determine. As with most dental traumatic injuries, horizontal root fractures occur more often in the maxillary central incisors of male patients (2). Root fractures are also more likely to occur in fully erupted permanent teeth with closed apices in which the completely formed root is solidly supported in the bone and the periodontium (7). A traumatic injury in a deciduous tooth or in one with an incompletely formed root with less periodontal support will most likely result in a luxation or avulsion injury rather than in a root fracture (8). Although horizontal root fractures are not common, the sequelae can be complex because of the combined damage to the pulp, dentin, cementum, bone, and periodontium (9).

Generally, fractured roots are diagnosed shortly after the injury (1) but occasionally they are identified at subsequent routine dental examinations (10–12). Clinical management of a fracture depends on its position and the extent of root involvement. Conservative treatment of the root fractures below the alveolar crest may require reduction of the dislocated fragment, immobilization, and relief of the occlusion (9, 10). Successful results from such treatment have been reported (1, 5). Spontaneous healing of the root fractures without treatment has been documented (11–16), however most of the reported cases are related to the anterior teeth. There are few reports related to spontaneous healing of fractured posterior teeth because root fractures occur rarely in posterior teeth (17). This case report presents the apparent healing of a maxillary first premolar with horizontal root fracture without treatment.

Case report

A 34-year-old female was referred to the Department of Endodontics, Faculty of Dentistry, Selçuk University with pain on the mandibular left first molar. Routine examination of full mouth radiographs revealed a horizontal root fracture in the middle third of both roots of the maxillary right first premolar (Fig. 1). The patient reported a traffic accident incident, which had occurred 14 years before. She had suffered trauma to the maxillary right posterior region on her face. She had imme-

Fig. 1. Periapical radiograph of the tooth showing horizontal root fractures of both roots.

Fig. 2. Clinical appearance of the tooth.

diately repositioned the tooth crown that was slightly dislocated palatally. As no complaint relating to the teeth occurred then, the patient had not been referred to the dentist. Soft and hard tissue examination showed no signs of scarring or any other evidence indicating previous trauma. The tooth was asymptomatic. There was no mobility, no spontaneous pain, no periodontal inflammation, no sign of previous or actual fistulae, and any tenderness or pain to palpation of the soft tissues or pain to percussion. No change in the color was seen. However, a small untreated enamel fracture was observed (Fig. 2). It responded positively to electrical pulp testing. Radiographic examination revealed no periapical or periradicular pathology and evidence of healed fracture lines of the buccal and palatal roots (Fig. 1).

Discussion

Traumatic fractures of teeth are, unfortunately, seen in most dental practices. Fractures of the posterior teeth, especially horizontal fractures, occur because of severe trauma: automobile accidents, sports injuries, or heavy blows delivered during altercations (18). Horizontal root fractures involving the posterior teeth are generally rare, requiring a directed blow with heavy force. In this case, the force due to the traffic accident was sufficient to lead to a horizontal root fracture in the maxillary right first premolar.

Healing of horizontal root fractures with or without initial treatment is reported to occur in up to 80% of the cases (1, 5, 14, 19). This case report is an example of the fact that a tooth with horizontal root fracture below the alveolar crest has a very good chance of survival even if it is not treated.

Healing of the root fracture has been investigated by Andreasen and Hjorting-Hensen (1). The first type of healing is with calcified tissue. A hard tissue callus forms around the fracture and the root is reunited. This is the most favorable type of healing and frequently the pulp remains vital, and mobility of the tooth is within physiologic limits. In the second type of healing, fibrous tissue develops between the fractured segments. The surfaces of the root fracture are covered by cementum and may undergo some resorption. The segments seem radiographically separated by a narrow radiolucent line, with edges rounded by surface resorption. The pulp may become calcified but usually remains vital and responsive to pulp tests. The third healing variety is characterized by interposition of bone and connective tissue between the fragments. This healing may occur only where continued alveolar growth results in further eruption of the coronal fragment. Obliteration of the pulp canals and normal vitality test results are typical findings. The fourth type by which root fractures heal is with interposition of granulation tissue. The pulp of the coronal fragment becomes necrotic and the pulp in the apical fragment remains vital. There is spontaneous tenderness and pain to percussion (20).

In the presented case, upon radiographic examination, the fragments appeared to be separated by a narrow radiolucent line and the fracture edges were rounded. This type of healing is likely to be related to the second type of healing. The fractured tooth responded to an electrical stimulation test indicating vitality. Furthermore, clinical and radiographic evaluations displayed no pathologic condition.

In this case, the severity of the trauma and the dislocation of the coronal fragment were probably not very severe, allowing the patient to reposition the coronal segment without any additional discomfort. If the displacement of the coronal segment is not severe, the prognosis increases (9, 11, 13, 21). In the presented case, the fracture occurred below the alveolar crest. Thus there was no communica-

tion between the sulcular bacteria and the oral environment and the prognosis increased (9, 22).

A previous report found that 31% of the patients with root fractures were identified coincidentally at subsequent dental radiographic examination (14) as in the presented case. This further illustrates the tremendous potential for spontaneous healing of the fracture and the maintenance of pulp vitality.

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