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ORIGINAL ARTICLE

Incidence of root canal treatment of second molars following adjacent impacted third molar extraction

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KEYWORDS
acute apical periodontitis;
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Abstract *Background/purpose:* The aim of this study was to evaluate the incidence of requirement for root canal treatment of adjacent second molars following the surgical extraction of an impacted third molar.
Materials and methods: The dental records of 6323 consecutive patients who had impacted third molars removed surgically were evaluated and the incidence of postoperative root canal treatment requirement of adjacent second molars was determined. Patients who required root canal treatment of neighboring second molars were accepted as the study group, while the remaining patients were accepted as a control group. Sex, age at the time of the operation, localization of third molar, the depth of impaction, angulation of the tooth, and the professional experience of the surgeon performing the operation were evaluated from patient records.
Results: The incidence of requirement of root canal treatment for second molars following a neighboring impacted third molar extraction was 0.17% (11/6323) and invariably occurred in the mandible. The mean age of the study group was found to be significantly higher than the control group (31 years vs. 23 years). The years of professional experience of the surgeons was significantly lower in the study group than in the control group.
Conclusion: Although the incidence is minimal, iatrogenic subluxation injuries occurring during the surgical removal of impacted third molars can lead to pulpal complications and a requirement for root canal treatment of adjacent second molars.

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Introduction

The surgical removal of third molars is the most frequent operation performed by oral and maxillofacial surgeons. Although it is generally considered a safe procedure, some complications can occur during surgery or in the postoperative period. Common postoperative complications associated with third molar extraction are: alveolitis (0.5—32.5%), infection (0.9—4.2%), postoperative bleeding (0.2—1.5%), transient dysfunction of the inferior alveolar nerve (0.6—5.5%), and permanent dysfunction of the inferior alveolar nerve (0.1—0.9%).[1,2]

Impacted third molars can be classified according to sagittal position as mesioangular, vertical, horizontal, or distoangular, and have been reported in close proximity to the adjacent second molar in 68.5% of cases.[3] In such cases, periodontal defects or distal caries of second molars may be observed.[4] Furthermore, during the extraction of an impacted third molar, varying degrees of dental trauma to the adjacent second molars can occur. The possible pulpal complications of the teeth that are exposed to trauma can be categorized as pulp canal obliteration, pulp necrosis, and internal root resorption.[5] Occasionally patients that have undergone impacted third molar extraction may refer to the clinic with pain or swelling at the extraction site during the late postoperative period, and these symptoms can be related to the adjacent second molars. The traumatic extraction procedure of impacted third molars can lead to pulpal complications at the healthy neighboring second molar.

Although there are several reports in literature regarding complications of impacted third molar extraction procedures,[6—8] there has been no study or clinical report about the incidence of root canal treatment requirement of healthy second molars following the extraction of a neighboring impacted third molar. The purpose of this study was to evaluate the incidence of requirement of root canal treatments of healthy second molars following the surgical extraction of an adjacent impacted third molar.

Materials and methods

The dental records of patients who underwent impacted upper or lower third molar extraction surgery at Baskent University Department of Oral and Maxillofacial Surgery from March 2008 to September 2013 were reviewed in this study.

Exclusion criteria of the patients are listed as follows:

- Periodontal disease, restoration, caries, craze, root canal treatment, prosthesis, or any other dental treatment of the neighboring second molar teeth prior to the impacted third molar removal procedure
- Patients with traumatic occlusion
- Impacted third molars with pericoronitis, pain, or gingival inflammation
- Impacted third molar removal procedure that exceeded 30 minutes
- Patients experiencing postoperative infection, periodontal lesions and defects, or nonhealing extraction sockets following the third molar removal procedure

The patients who had asymptomatic and healthy impacted third molars and intact neighboring second molars were established and 6323 consecutive patients were finally included in this study.

Sex, age during the operation, localization of the tooth (upper or lower; right or left third molar), the depth of impaction according to Pell and Gregory classification (Class A: the occlusal plane of the impacted tooth is at the same level as the adjacent tooth; Class B: the occlusal plane of the impacted tooth is between the occlusal plane and the cervical line of the adjacent tooth; Class C: the occlusal plane of the impacted tooth is apical to the cervical line of the adjacent tooth), the angulation of the impacted tooth (mesioangular, vertical, horizontal, or distoangular), and the professional experience of the surgeon performing the operation were evaluated from the patient records. Regarding surgical technique, under local anesthesia a buccal sulcular incision was performed from the second molar distally, ending with a mesio-bucally oriented vertical releasing incision. A mucoperiosteal flap was raised. Bone was removed on the buccal and/or distal aspects of the third molar using a surgical bur when the third molar was a fully retained tooth, whereas a mucoperiosteal flap was released but no bone removal was performed during the extraction of a partially retained tooth. The tooth was appropriately split and removed, followed by copious irrigation and suturing with resorbable 3/0 sutures. Postoperative antibiotics, analgesic, and mouth rinse were prescribed to all patients. A follow-up appointment at 1 week was arranged to assess healing, masticatory function, and to remove the sutures.

Of the 6323 patients examined, 11 patients had a postoperative sensitivity on the neighboring second molar teeth, rendering them tender to percussion and mastication. These patients were referred to the endodontic clinic for a detailed examination and management. The teeth responded normally to electric pulp testing (Parkell, Farmingdale, NY, USA) at the time of the first control (1-week period). Radiographic and clinical examinations did not reveal any crack formation, root fracture, and periapical bone destruction of the involved teeth; although an occasional slight widening of the apical periodontal ligament space was observed. The preliminary treatment consisted of relief of occlusal interferences and ordination of a soft diet for approximately 2 weeks. Splinting of the involved teeth was not performed, as fixation does not appear to promote healing in concussion and subluxation injuries.[9] Monitoring and evaluating the condition of the pulp and the supporting structures clinically and radiographically were also recommended after 1 month and 2 months.

Of the 11 patients examined, two patients, four patients, and five patients returned after 2 weeks, 1 month, and 2 months, respectively, with symptoms of acute apical periodontitis including moderate-to-severe intensity in pain, pain in biting, and vertical percussion. Electric pulp testing and cold application using a refrigerant spray (Chloraethyl; IGS Aerosols GmbH, Baden, Germany) was negative after a 1-month period. Of the 11 teeth examined, four teeth had grade-2 mobility. Periodontal probing depths were mostly within normal limits except for five teeth, which indicated a distal probing depth $>$5.5 mm. Radiographic examination revealed a periapical bone destruction of the involved teeth after a 2-month period.