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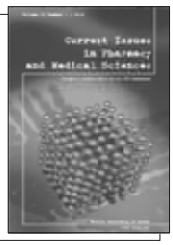

Foreign body in the maxillary sinus – a case report

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ABSTRACTS

Contemporary dental treatment primarily aims at the longest preservation of the patient's own dentition, provision of the proper function of chewing, as well as aesthetic requirements. According to literature, the percentage of successful endodontic treatment is particularly high and ranges from 92-98%. One of the most frequent complications of the endodontic treatment is overfilling of the root canal. Sometimes endodontic material penetrates to the maxillary sinus or to the mandibular canal. Here we describe a case of gigantic extrusion of endodontic material into the right maxillary sinus detected by means of a CBCT examination. Gigantic root canal overfilling can be precisely diagnosed by means of a CBCT scanning with lower effective patient dose than CT. The presented case underlines that attention must be paid to the amount of endodontic obturation material used during filling of root canals in order to prevent gross overfilling with potential extrusion of sealer to maxillary sinus.

Keywords: maxillary sinus, foreign body, root canal overfilling, CBCT

INTRODUCTION

Contemporary dentistry primarily aims at the longest preservation of the patient's own dentition, provision of the proper function of swallowing, as well as aesthetic requirements [17]. Detailed examination of pulpal pathology and the study of composition of the periodontium structures, of anatomy and topography of root canals as well as the use of new diagnostic equipment, novel dental materials and techniques of managing of root canals lead to higher efficacy of endodontic treatment [14].

According to literature, the percentage of successful endodontic treatment is particularly high and ranges from 92-98% [5]. Nowadays the development of endodontics allows preserving teeth that formerly would be classified for extraction [17]. However, root canal therapy may as well cause post-endodontic complications. Namely, while removing the pulp or during the mechanical preparation of a canal, or root canal filling, the periodontal ligament can be seriously affected in consequence of endodontic tools penetrating outside the apical foramen. One of the most frequent complications of the endodontic treatment is overfilling of the root canal. Sometimes endodontic material (endodontic sealer or gutta-percha point) penetrates to the maxillary sinus or to the mandibular canal. Such instances are frequently caused by excessive widening of a root canal beyond the physiological foramen. Furthermore, post treatment complications may also result from unreasonable behaviour of a dentist conducting the canal filling, who does not pay much attention to a large amount of endodontic material being used and pushed outside the root canal. Moreover, penetration of the material can be also promoted by tooth anatomy – a wide apical foramen [14].

A defective endodontic treatment of lower premolar and molar teeth as well as penetration of the endodontic material to mandibular canal may cause damage in the structure of the inferior alveolar nerve that results from a mechanical complex induced by a tool penetrating the anatomic root apex, or pressure growth in the mandibular canal, or neurotoxic interaction of endodontic sealers [11].

Cone-Beam Computed Tomography (CBCT) is a considerably new modality of radiographic cross-sectional imaging of maxillofacial region. During examination X-ray tube emits beam in the form of the cone (hence the name of this tomographic method). Creation of radiographic images is based on registration of X-ray attenuation in a selected volume – Field of View (FOV) – consisting of small voxels resulting in high resolution of images and excellent quality of imaging of dentomaxillofacial hard tissues (Scarfe). In CBCT units with a large FOV not only dental arches are visible, but paranasal sinuses can be examined as well. Vicinity of maxillary sinuses and apices of lateral upper teeth in case of periapical pathologies leads to inflammatory lesions in the antra. CBCT well demonstrates overfilling of root canals and presence of endodontic obturation material in maxillary sinuses.

The aim of the paper is to present a case of gigantic extrusion of endodontic material into the maxillary sinus detected by means of a CBCT examination.

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CASE HISTORY AND CLINICAL EXAMINATION

A patient, 30-years-old Caucasian male, was referred to the Chair and Department of Oral Surgery due to dental pain, escalating periodically, which was probably related to inflammation of the right maxillary sinus. According to the patient's information, the tooth 16 had been subjected to the endodontic treatment and during several recent visits a dentist had filled the root canals as many as six times. Intraoral examination revealed a cavity in the right second maxillary molar, which was filled with a temporary filling material. Next, the patient was referred for panoramic radiography. The panoramic image demonstrated dense radiopacity of uneven shapes, spreading from root apexes of the tooth 16 up to the right maxillary sinus (fig. 1). For a more precise diagnostics of the proportions and location of the radiopacity (presumably endodontic sealer), the patient underwent a Cone-Beam Computed Tomography examination performed by means of a Galileos (Sirona, Germany) machine. The dedicated Galaxis software was used in order to obtain multiplanar slices of maxillary sinus and alveolar process. On the basis of CBCT it was found that the endodontic material was pushed via perforation of the palatal root of the tooth 16. The molar was qualified for extraction. Examination of the extracted tooth confirmed the initial diagnosis – perforation of the palatal root over its entire length with gigantic amounts of sealer in the maxillary sinus.

Fig. 1. Panoramic radiograph of the patient at the time of notification at the Department

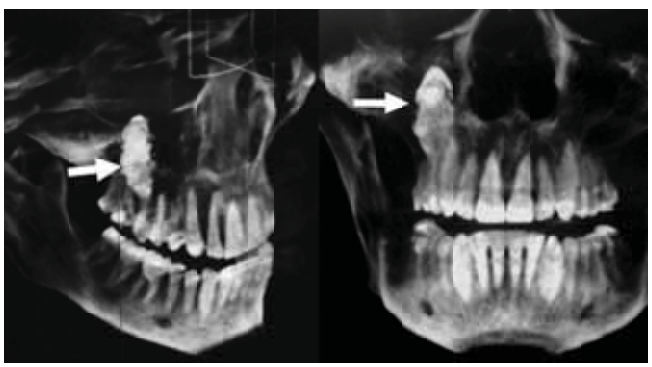

Fig. 2.a, b. 3D reconstructions of the patient's skull from CBCT volume shows gigantic radiopacity in the right maxillary sinus

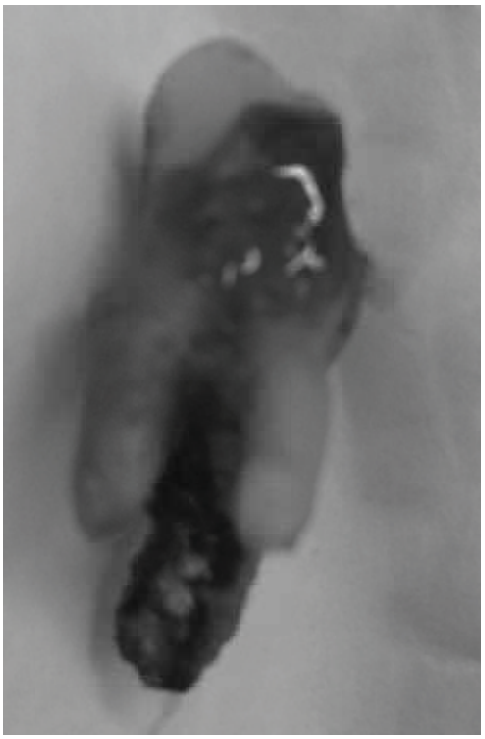

Fig. 3. Tooth after extraction - perforated palatal root

After premedication following anesthesia tooth 16 was extracted using Berten forceps for upper right molars. After extraction, there was formed an oro-antral communication, there was conducted a abundant rinse of the right maxillary sinus using the saline solution through the created communication. In washing fluid a considerable amount of sealer was found as well. Sinus surgery with plastics of a formed communication was performed. The healing process was completed successfully.

DISCUSSION

Overfilling of root canals of maxillary molars results in presence of endodontic material beyond the root apex. Small amounts of filling material pushed over the radiological root apex and located in periapical bone tissue may undergo spontaneous resorption [10]. However, relocation of root canal sealer into maxillary sinus is one of the most serious complications of endodontic treatment as it may lead to unspecific inflammation of maxillary mucosa, and in selected cases even to stimulation of fungal growth, especially endodontic sealers containing zinc (Aspergillus *spp*.) and emergence of an antrolith [1, 2, 4, 7, 12]. Small foreign bodies may be transported by cilia of the epithelial lining in the maxillary sinus in the mucous-containing fluid via the ostium to the nasal cavity [8]. Large foreign bodies, including large quantities of extruded endodontic material, will not migrate against the influence of gravity up the nasal wall of the sinus and must be removed surgically [8]. Therefore, precise diagnostics of root canal overfilling with probable extrusion of endodontic material into the maxillary sinus is indispensable. CBCT seems to be an ideal imaging tool for exact

determination of presence, size and localization of endodontic sealer. Multiplanar slices allow three-dimensional localization of the foreign body as well as accurate measurements. Information derived from a CBCT volume is sufficient for a dental surgeon to classify a tooth for extraction as well as to plan the surgery.

Literature describing overfilling of root canals resulting in presence of endodontic sealer in paranasal sinuses in not vast, and reports focus on the occurrence of aspergillosis in the maxillary sinus as a complication of an endodontic foreign body impaction [7, 15]. According to authors' knowledge, the current case presents an exceptionally massive extrusion of endodontic material in comparison with other case reports available in literature [3, 6, 16].

Yamaguchi et al. [16] described a case of endodontic material pushed into right maxillary sinus during endodontic treatment of the first maxillary molar. The diagnosis was based on panoramic radiograph followed by CT (Computed Tomography) scan. The maxillary sinus radiopacity was a grossly extruded cord-like substance dislocated to the upper portion of the sinal cavity. The foreign substances were extirpated and diagnosed as gutta-percha.

Costa et al. [3] presented a case of a radiopacity of the left maxillary sinus visible on a panoramic radiograph. Performed CT scanning showed the presence of a foreign body located in the supero medial aspect of the maxillary sinus, near the natural maxillary ostium with partial mucosal thickening of the sinus upon the roots of the upper first molar. The radiopaque foreign body, measuring about 5 mm in diameter, was extracted by means of an endonasal endoscopic approach. The material was residual endodontic cement.

Migration of a gutta-percha point from a root canal into the ethmoid sinus is extremely rare and was described only by Ishikawa et al. (6). Initial radiography showed a fine foreign body in the region of the nasal cavity with accompanying left maxillary sinusitis. Also in this case CT was used to demonstrate the character of a foreign body, which was located in the anterior ethmoid sinus.

It should be underlined that a large FOV CBCT examination is favourable in diagnostics of root canal overfilling in comparison with medical CT due to considerably lower effective dose of X-rays [9]. The CBCT unit used in the study has a FOV of 15 cm in diameter, which covers complete maxillary sinuses, ethmoids and sphenoid sinus, as well as inferior part of frontal sinuses (depending on their pneumatization) thus it can be useful in diagnostics of foreign bodies related to root canal overfilling.

In conclusion, gigantic root canal overfilling can be precisely diagnosed by means of a CBCT scanning with lower effective patient dose than CT. The presented case underlines that attention must be paid to the amount of endodontic obturation material used during filling of root canals in order to prevent gross overfilling with potential extrusion of sealer to maxillary sinus.

CONCLUSION

Dislocation of endodontic material beyond the root canal may cause inflammatory disorders that in consequence may lead to tooth extraction. Gigantic root canal overfilling can be precisely diagnosed by means of a CBCT scanning with lower effective patient dose than CT. The presented case shows that attention must be paid to the amount of endodontic obturation material used during filling of root canals in order to prevent gross overfilling with potential extrusion of sealer to maxillary sinus.

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