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The displacement of a broken root canal instrument in the space of floor of the mouth

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Introduction

The aim of the endodontic treatment is to obtain sealed filling of root canals, which allows to eliminate inflammation of periapical region and maintain the proper function of the tooth. Endodontic treatment is one of the most precise and at the same time the most difficult areas of dentistry. This implies that it is bound with a number of complications. The occurrence of complications can be caused by unusual anatomy of the tooth, defects of endodontic instruments or iatrogenic. Possible complications of endodontic treatment may include irritation of the surrounding tissue by instruments or rinsing solutions, aspiration or swallowing of an endodontic instrument, perforation of the root or crown chamber, root fracture resulting from the excessive widening of canal, improper canal filling or breaking the endodontic instrument in the root canal. [1, 2]

Studies in Swedish population showed that during the five year period between successive stages of a clinical trial from 4889 assessed teeth 197 were lost. 33% of lost teeth were treated endodontically. Within endodontically treated teeth 68% had underfilled canals at length of more than 2 mm from the apex, and in case of 45% of teeth filling of canals was rated as leaking [3]. The vast majority of complications can be avoided by careful planning of treatment using modern diagnostic techniques and the use of modern medical technology. [4] The knowledge and practice of the doctor performing the surgery is also extremely important.

Case report

Patient 20 years old came to the Department of Oral Surgery of the Medical University in Lublin for consultation. The patient stated that during endodontic treatment of tooth 37 an endodontic instrument has been displaced beyond the apex of the tooth. Due to the presence of perforation in the fundus of the tooth chamber, which size did not allow for the closure with MTA material, tooth 37 has been extracted. The patient stated that the instrument was not removed during the extraction procedure. During the examination conducted in the Department of Oral Surgery it was noted that the patient does not report any general diseases or allergies. Physical examination revealed the presence of sutured extraction socket during the process of tissue healing. The CBCT was performed in order to visualize the position of broken instrument. The scans revealed the presence of a fragment of the root canal instrument displaced into the floor of the mouth in the area of the bottom part of the extraction socket. [Figure 1, 2].

Fig.1 CBCT scan in frontal aspect showing broken endodontic tool.

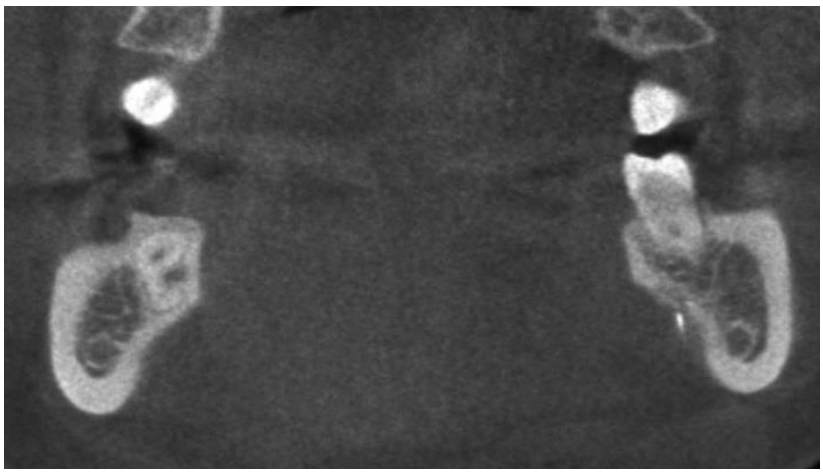
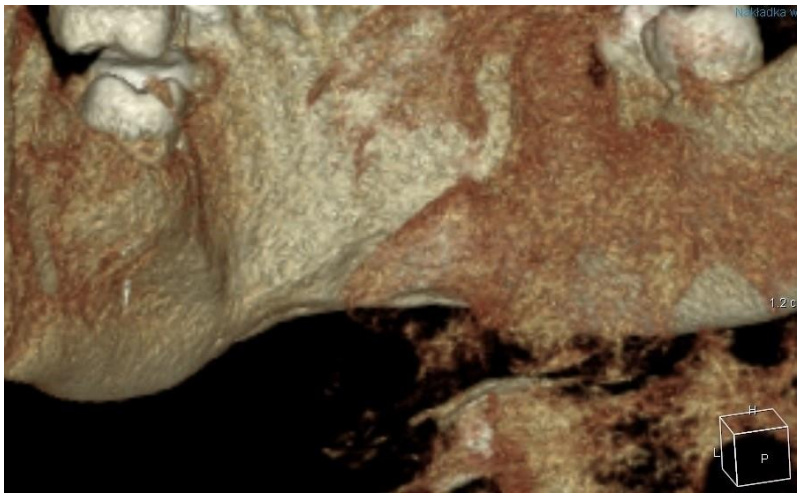
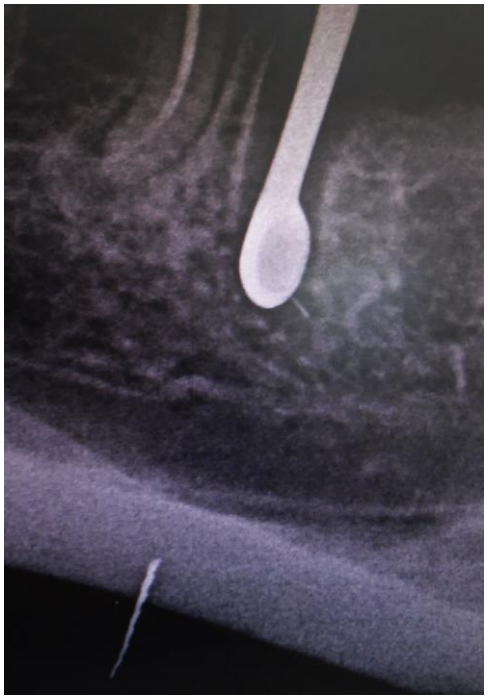


Fig. 2. CBCT 3D reconstruction.



After presentation of treatment plan to the patient and obtaining written consent for the procedure the surgical part of treatment was started. Just before the surgery X-ray was performed to make sure that there was no further displacement of the tool instrument within the soft tissues. [Figure 3].

Fig. 3. Intraoral X-ray, confirmation of position of the instrument, before flap elevation.



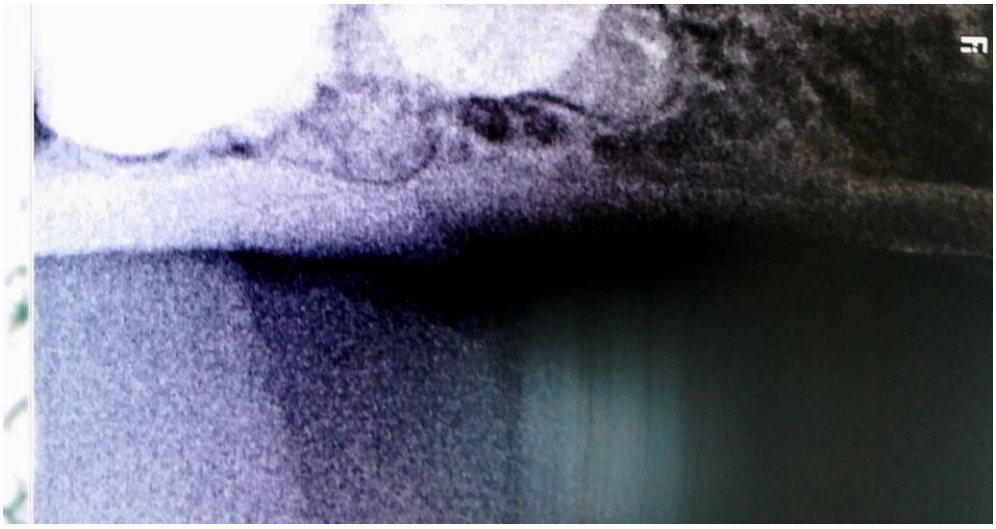
Infiltration anesthesia of lingual and buccal nerves and block of infraalveolar nerve with articaine (Citocartin 200) were made. Then, an incision and elevation of envelope flap

was made in the area from the retromolar triangle to the area of first premolar from the lingual site. The flap was elevated from bone to the attachment of mylo-hyoid muscle [Figure 4].

Fig. 4. Intraoral clinical view, surgical approach.

The broken piece of a Hedstroem file was visualized. The instrument has been removed using surgical suction. Control X ray was made in the occlusal projection and projection of tooth in order to confirm that all parts of instrument were removed. [Figure 5].

Fig. 5. Radiological confirmation of removal of the instrument from the soft tissues, during surgery.



A revision of socket after extraction of tooth 37 was performed. The bone defect was filed with collagen sponge soaked in gentamicin. Postoperative wound was secured with non-resorbable interrupted sutures.

A 6-day course of antibiotics clindamycin (600 mg every 12 hours) was recommended. Immediately after the surgical procedure intramuscular injection of 75 mg of diclofenac and intravenous injection of 8 mg of dexamethasone were made. Patient endured surgical treatment well. The patient reported daily for control visits for 5 days. After 7 days the sutures were removed. No complications in follow-up were found [Figure 6].

Fig. 6. Intraoral clinical view in 7 days follow-up after surgery.

Discussion

Root canal treatment requires a lot of operating precision in small and very often hard to access site. Complications that occur during treatment usually result from incorrect management during root canal treatment procedure, so they are iatrogenic. [5] One of complications is perforation of root canal combined with fracture of endodontic file and its dislocation to soft tissues of oral cavity. Endodontic instruments rarely separate beyond the apical foramen. Complicated tophographic anatomy of the angle and corpus of mandible causes, that dislocated foregin bodies may find themselves in spaces: sublingual, submandibular, pterygomandibular, subtemporal and parapharyngeal. In such cases the fractured segment, always accompanied with bacteria and dentine debris might cause inflammation. Other results of this complication can be chronic pain, paraesthesia and systemic infections. Moreover, patients often regard the fractured segment as “a broken needle” and suffer psychologically. Therefore, an attempt to remove the segment from such cases with a surgical approach is often necessary. However, determining the indications for

surgery in the absence of clinical signs, we must always consider whether the attempt to remove the foreign body does not cause major, secondary damage or life-threatening for the patient. Before planned surgery, precise diagnostic is demanded , not only traditional intraoral radiograph, but also CBCT to determine the position and size of the foreign body and its relation to adjacent tissues. Periapical radiography can be used only to confirm the presence of foregin body and its approximate position. Using the CBCT enable more precisely diagnostic, including the identification of the exact spatial relationships, the three-dimensional representation image. [6,7,8] The removal of foreign bodies dislocated to soft tissues is always difficult, especially where they are close to important anatomical structures. Thus, in case of doubt about leaving a broken instrument in the root canal or its dislocation into the surrounding tissue it is indicated to confirm or deny it in radiographic examination after treatment. It is recommended to remove foreign body as soon as possible to prevent pain, inflammation and further migration and damage to surrounding structures. However, the surgery of removing a broken fragment of the root canal instrument can lead to tissue damage, vascular and neurological complications, which is why some suggest removal only if the patient presents pathological symptoms. [7,8]

In this clinical case attempt of removing fractured instrument from root canal led to iatogenic dislocation of encodontic file to deeper structures of the floor of oral cavity. The risk of a possible displacement of the instrument in this space prone decision to remove it. It should be emphasized the importance of careful and thorough preparation of the tissues, so as not to cause the movement of the instrument or damage of anatomical structures, such as branches of lingual nerve or vessels. It is also important to use radiological examination during a procedure, what makes it easier and safer.

Conclusions

The occurrence of complications of root canal treatment, which is displacement of endodontic instruments in the surrounding tissue, requires accurate diagnosis, clinical and as well radiological. The mobility of the soft tissues may cause displacement of the tool and damage to important anatomical structures. Surgical treatment must be precisely planned to avoid or increase occurrence of iatrogenic complications.

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