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Multiple Accessory Mental Foramen: A Rare Anatomical Finding

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Abstract

The mental foramen is one of the most important anatomical landmark of mandible. It is also described as the front opening of the mandibular canal. It contains a branch of inferior alveolar nerve which is named mental nerve. In general, it is found one mental foramen on each side of mandible. On rare occasions, more than one mental foramen could be found on each side of mandible; the term "accessory mental foramen" is used. Accurate identification of these anatomical structures will provide the practitioners to avoid nerve damages, bleedings and complications in performing surgery procedures. Hence, comprehensive and detailed preoperative radiologic evaluation should be applied by using appropriate radiologic technique. This article presents a rare case of multiple accessory mental foramen which was detected incidentally by CBCT in a 52-year-old male patient.

Keywords: Accessory Mental Foramen; Anatomical Variation; Cone Beam Computed Tomography

Introduction

The mental foramen is the one of the most important anatomical landmarks of dentomaxillofacial area. The mental foramen is situated on the buccal cortex of themandibular bone and usually found between the roots of first and second mandibular premolars or apical to the second premolar [1-4]. It contains mental nerve which is a branch of inferior alveolar nerve and innervates the skin of mental area and lower lip, mucous membranes. It also innervates the gingiva as far posteriorly as the second premolar as well as tissues adjacent to the canine and incisor areas [4,5].

Accessory mental foramen is a rare anatomical variation. It is defined as presence of additional foramen(s) in mental foramen region. The general incidence of multiple mental foramina appears to range from 2% to 10% depends on ethnicities according to the literature [6]. Due to success of endodontic treatments and surgery procedures such as genioplasty, root resection, and dental implant rehabilitation, accurate diagnosis of accessory mental foramen is important. With the increase of dental implant applications, determining the correct anatomy and its possible variations plays an crucial role to avoid complications such as bleeding, hemorrhage and paresthesia [1,4].

Although the conventional imaging modalities such as periapical and panoramic are the most common imaging techniques in dental practice, but they often fail to obtain sufficient information. With the development of three dimensional imaging modalities such as Computed Tomography (CT) and Cone-Beam Computed Tomography (CBCT), detalied multiplanar evaluation of maxillofacial region can be conducted for further analysis of these anatomical variations [1,4,5]. Hence, comprehensive and detailed preoperative radiologic evaluation should be applied by using appropriate radiologic technique. This report describes a rare anatomical variation which was not noticed on conventional radiographic technique but incidentally found in CBCT images in the pre-operative assessment of a patient.

Case Report

A 52-year-old man referred to the Department of Dentomaxillofacial Radiology, Health Sciences University, Faculty of Gulhane Dentistry, Ankara, Turkey with symptoms of pain and swelling localized on the both sides of retro molar area. He had no history of any systemic disease and did not use any medication.

Extra oral examinations showed a slight swelling on the left side of mandible. It is also learned from the patient that several times he had been suffering with swelling and pain for nearly 5 years. In addition, it is also learned that he had used antibiotics several times, than he had decided to cancel visiting dentist. Intraoral examination revealed a swelling at the left side of vestibular retro molar area and also seen that mucosa was raised at the level of occlusion. Third molars at the both side were not observed.

For radiologic examination, it was decided to perform panoramic radiography. On panoramic radiograph, large, radiolucent, cyst-like lesions involving embedded third molars were observed at the both sides of mandible. At the right side, it was seen that the lesion expanded from the angle of the mandible to the apical of first molar tooth. The inverted third molar was associated with the lesion. At the left side, lesion was expanded from the mandibular ramus to the apices of second molar. The third molar of left side was horizontally impacted. It was also detected a loop-like view at the left mental foramen (Figure 1). In order to determine the appropriate surgical approach and to obtain more detailed information about lesion, it was decided for an examination by 3D Accuitomo 170 (3D Accuitomo; J Morita Mfg. Corp., Kyoto, Japan).A reconstructed three-dimensional image revealed incidentally one accessory opening in the cortical bone of the right mandible and two accessory foramens on the left (Figure 2). These anatomical variations were also seen in cross-sectional (Figure 3-4) and sagittalslices (Figure 5). After comprehensive clinical and radiologic evaluation of patient it was decided to enucleate of lesions under general anesthesia, patient was informed and an appointment was given for surgery. But unfortunately on the date of planned surgery, patient did not come to the appointment, hence operation was cancelled. The patient did not show any attempt to have for another appointment. Finally it was learned that the patient had been given up for surgery.

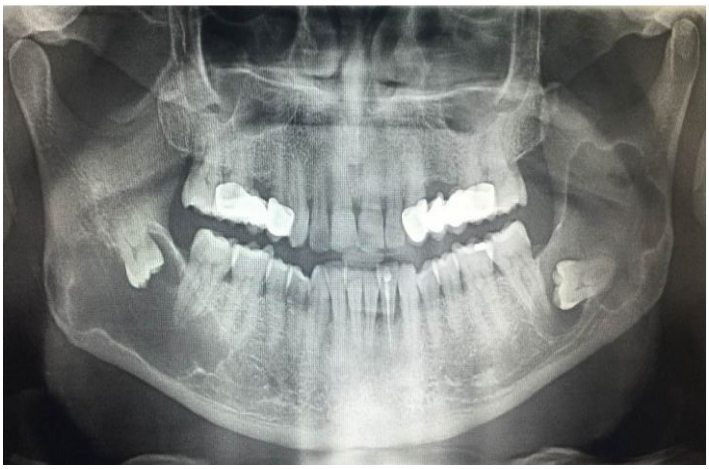

Figure 1: Panoramic radiograph of a 52-year-old man shows large, well-defined unilocular cyst-like radiolucencies involving embedded third molars at both sides of mandible.

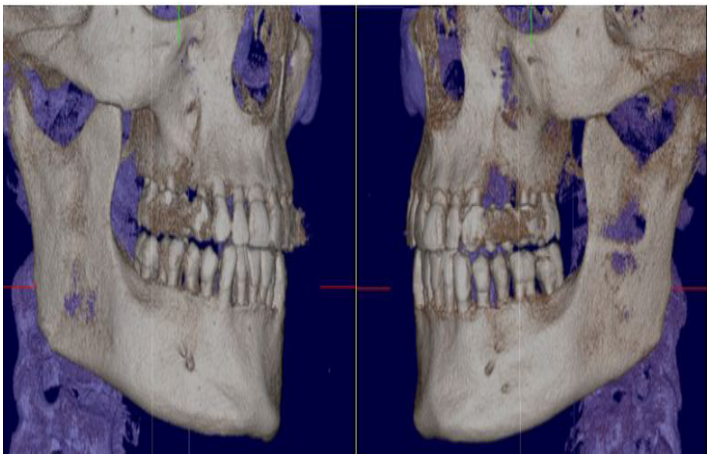

Figure 2: 3D reconstruction showing a double foramen on the right side, and three openings on the left body of the mandible.

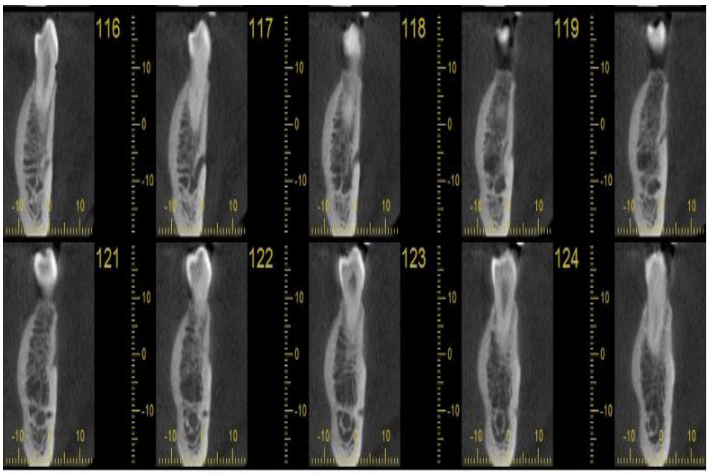

Figure 3: Cross-sectional view of the left mental foramen and accessory mental foramens.

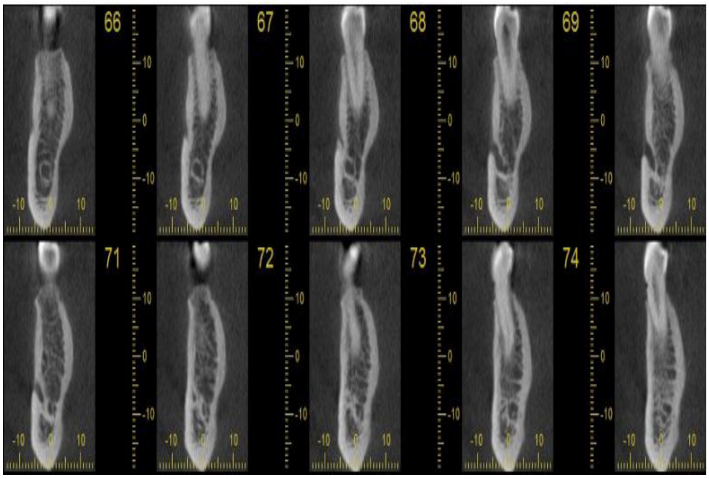

Figure 4: Cross-sectional view of the right mental foramen and accessory mental foramen.

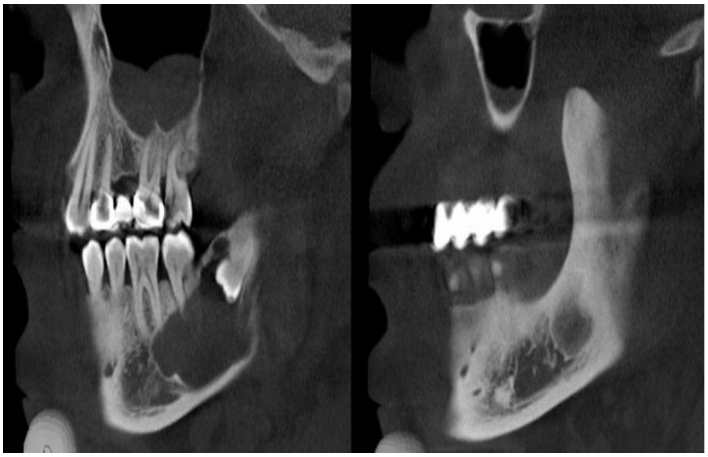

Figure 5: Sagittal views of the both sides of mandible show two mental foramens and three accessory mental foramens.

Discussion

Since the first published article of accessory mental foramen by Simonton in 1923 [7], the authors have been focused to other variations such as incisive canal, anterior loop and bifid mandibular canal. There are several reports that were identifying accessory mental foramen, locations and characteristics. Most of the published reports are studies on dry skulls while some others have studied the panoramic radiographs of clinical cases. There are a few CBCT studies. Knowledge of the anatomical characteristics of accessory mental foramen plays an important role to avoid complications. So, aim of this report was to emphasize the importance of this variation.

The presence of more than one accessory foramen in mental foramen region is described as accessory mental foramen. At this point it should be differentiated that the accessory foramen was an accessory foramen or only a nutrient canal. According to the literature, accessory mental foramen is defined as a bony foramen originated from the mandibular canal. But the nutritious foramen is not originated from the mandibular canal. In addition, dimensions of nutrient foramen are smaller than mental foramen [8,9]. In this case report we observed one accessory mental foramen which originated from the mandibular canal at the right side, and two foramens with same situation at the left side. They were all defined as accessory mental foramen.

According to previously published reports, the incidence of accessory mental foramen varies in different ethnic groups [5,10]. Sawyer et al. [10] reported the frequency of accessory mental foramen between 1.4%-9% in different ethnic groups. Hori et al. [11] reported the incidence rate as 7.6% in Japanese people. In another study which was designed on cadavers, two mental foramens were noted as 10% [5]. But there is no indication whether they were unilateral or bilateral. To the best of our knowledge there are only a few studies that report bilateral multiple mental foramens [11,12]. Bilateral accessory mental foramen cases are seen rarely and found in 0.53% of total population [13,14].

Two dimensional conventional imaging modalities such as panoramic and periapical are commonly used in dental practice. Although these modalities generally obtain sufficient information of maxillofacial region, but sometimes they fail in detecting anatomical variations or led misdiagnosis. Naitoh et al. [15] reported that only 48.6% of the cases with accessory mental foramen which detected on CBCT images were seen on panoramic radiographs. In addition, there are only a few case reports that were presented by using panoramic radiography [16,17]. In order to have more reliable information, more than two dimensions are needed. Therefore, 3D imaging systems have been used to obtain more useful information about maxillofacial structures. CT and CBCT are the most reliable imaging modalities for identification and localization of such structures, as well as their anatomical variations [8]. In our report, the mental foramen region was not our first interested area; nevertheless, accessory mental foramens were not detected on panoramic radiograph. They were observed after CBCT examination.

In conclusion, the present report describes a very rare case of accessory mental foramen. Although the mental foramen is one of the most known anatomical landmarks of maxillofacial region, we believe that the knowledge of an anatomical variant of this structure is not the expected level. Accurate diagnosis and correct identification of this anatomical variation will provide the practitioners to avoid nerve damages, bleedings and complications. Hence, comprehensive and detailed preoperative radiologic evaluation should be applied by using appropriate imaging modality.

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