A rare crestal branch of inferior alveolar nerve: case report

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Abstract

Objective: Sectional imaging modalities are accurate techniques for the identification and localization of the mandibular canal anatomy and variations. The aim of this study was to evaluate the mandibular nerve accessory branches. Existence of these variations may cause some difficulties in anesthesia and also in surgical procedures such as implant planning.

Case: The authors report a rare crestal branching of right mandibular canal in a 49 year old male observed in cone beam computed tomography image.

Conclusion: Although this anatomical variation is rare, it should be kept in mind.

Key words: CBCT, Mandibular nerve, Branching

Introduction:

The mandibular nerve is the third division of the trigeminal nerve (5th cranial nerve). It is predominantly a sensory nerve, but also has motor components. From the trigeminal ganglion, through the foramen oval, the mandibular nerve descends down towards the mandibular foramen on the medial aspect of the mandibular ramus. The position of this foramen and the course of the nerve are well established by many authors (1).

Dental and incisive branches leave the inferior alveolar nerve (IAN) within the canal to supply the teeth and adjacent structure. A terminal branch leaves the canal at the mental foramen to become the mental nerve (2). The radiographic image of the mandibular canal is a dark linear shadow with thin radiopaque superior and inferior cast by the lamella of bone that bounds the canal. There are multiple smaller branches of the inferior alveolar nerve running roughly parallel to the major trunk. Occasionally these branches are large enough that they have a secondary mandibular canal. Such bifid canals are seen most commonly on panoramic and computed tomography (CT) images (3). Computed tomography and cone beam computed tomography (CBCT) is the most accurate imaging modality for the identification and localization of the mandibular canal and mandibular foramen (4). There are different types and classifications for bifid mandibular canals (5-7). Frequency of bifid mandibular canal has been reported as 0.08% by Gorvet and Lorton (1983) (8) and 0.9% by Nortje et al. (1997) (5). Also an accessory mental foramen is reported with prevalence ranging from 1.4 to 10% (4). Existence of this variation may cause some difficulties in anesthesia and also in surgical procedures such as implant treatment plans and traumatic injuries management (3,8,9). The aim of this article is to report a rare case of branching of the mandibular canal and supplemental foramen to the crest of edentulous ridge.

Case Report:

A 49-year-old man was referred to a private oral
and maxillofacial radiology center for CBCT imaging for implant treatment planning. The patient had no history of known systemic disease and pathological conditions in the maxillofacial region. Oral and maxillofacial examination yielded no obvious abnormalities. The oral mucosa showed a strictly normal appearance.

With a view toward implant placement surgery for lower jaw, a CBCT image was obtained by using Promax 3D unit (Planmeca, Helsinki, Finland) with 0.48 mm slices in the axial plans. Imaging parameters were as follows: 84 kVp; 16 mA; field of view, 80 × 80 mm.

In surveying of cross-sectional images of CBCT, we observed an accessory branch of mandibular canal in the edentulous area of teeth 47 and 48 in a canalicular manner (Figure 1,2).

**Figure 1**- Continuous cross-sectional images show the beginning and end of IAN branching in right edentulous area.

**Figure 2**: Axial image shows the canalicular shape of IAN branching.
The accessory branch moved upward and exited on top of the crestal ridge of edentulous area posterior to the area of tooth number 46. The patient has had transient paresthesia in mental area since extraction of two teeth. The IAN was normal in its anterior path toward the mental foramen. We warned the surgery team about this accessory branch to avoid any damage to neuromuscular bundle during implant insertion.

**Discussion:**

Knowledge about the position and course of IAN and its possible branches is important not only for adequate local anesthesia but also important for dental, oncological and reconstructive operations (10). Variations of mandibular canal and mental foramen were reported in the journals (4,8,12,13). Presence of double mandibular canal or accessory mental foramen may cause problems with inadequate anesthesia of mandible or difficulties with jaw surgeries (3,8,9).

Anil et al reported that variations in the anatomy of the IAN were found in 2 of 20 dissections. According to study of Yamada et al. at least one branch from the IAN could be detected in 94.6% (13). In our case due to the position of existing accessory branch of IAN in crestal area, may cause some problems with prosthetic dentures or even normal mastication.

Nowadays, availability of sectional imaging modalities makes diagnosis of such anatomical variations much easier. However if only panoramic radiograph can be obtained, in order to improve visualization of the mandibular canal, the patient’s head should be tilted approximately 5° downward with reference to the Frankfort horizontal plan bar of the machine, as suggested by Dharmar (1997) (14).

Finally In order to prevent any difficulties with anesthesia and undesired injuries to neurovascular bundle the probability of mandibular canal variations such as bifid mandibular canal, accessory mental foramen and different types of branching should be kept in mind.

The available treatment options are nerve transposition or using bone grafts. Alternative restorative solutions should also be considered.

**Conclusion:**

Although this anatomical variation is rare, it should be kept in mind.

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**References:**