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Case Report

Bilateral accessory mental foramen – A case rarity in cone beam computed tomography

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Abstract

The human mandible has been a fascinating subject of study and extensive research in the realm of human anatomy because of its intricate structure and remarkable variation. One important mandibular anatomical component with clinical significance is the mental foramen. An uncommon anatomical variant is accessory mental foramen. Nevertheless, after mandibular surgery, special attention should be given to the potential existence of one or more auxiliary mental foramen in order to prevent neurovascular problems. In this instance, we describe a variant that was perceived as an incidental radiologic finding: bilateral accessory mental foramen.

Keywords: Accessory mental foramen, Rare, CBCT, Anatomical variation.

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1. Introduction

The mental foramen, or MF, is situated on the mandibular lateral side, typically inferior to the bilateral interproximal region of the first and second premolars.[1] This foramen, which in adults is positioned posterior-superiorly, is where the veins and mental nerve leave the bone.[2] The inferior alveolar nerve separates into the mental and incisive nerves in the premolar area. Intraosseous veins and the incisive nerve innervate anterior mandibular teeth.[3] At the MF, the mental nerve splits into four branches: angular, medial & lateral inferior labial, and mental.[4]

Radiographs and dry human mandibles have previously shown the absence and variety of auxiliary mental foramina, which can vary from 0.2% to 10.6% on one side. The prevalence of a single Accessory mental foramina (AMF) is rare, ranging from 1.7% to 10%. The incidence of double AMF is lower, ranging from 0.7% to 1.2%.[5]

In their retrospective investigation of 150 patients, Katakami K et al.[6] found that 16 of them had double foramina (10.6%) and triple mental foramina on one side (0.6%) on cone beam computed tomography (CBCT). However, out of 157 patients using CBCT, Naitoh et al. discovered two (1.2%) with triple mental foramina on the contralateral side and 11 (7%) with double on one side.

The MF appears radiographically as a single, bilateral, circular or elliptical, radiolucent lesion in the premolar region. Seldom are reports of numerous MF or the absence of MF made.[7,8] Using dissections, surgical discoveries, conventional radiographs, spiral computed tomography (CT), and cone beam CT, the presence of several MF, known as accessory mental foramina (AMF), has been documented.[9]

Cone Beam Computed Tomography (CBCT) is the most precise radiological localization technique available. It will assist dentists and oral surgeons in fixing mandibular fractures and installing implants while planning surgery to

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maintain the auxiliary mental nerve. CBCT offers some useful information from anatomic structures and diseases, unlike 2-dimensional imaging modalities as periapical and panoramic radiography techniques.[10]

In surgeries such lower tooth flap operations, periodontal procedures, retrograde amalgam fillings, apico-curretage of mandibular premolars, surgical orthodontics, and other lower lip surgical procedures, it is crucial to accurately determine the anatomical location of the mental foramen.[11] Dental surgeons need to be well-versed on the relationships between the mental foramen, the lower premolar teeth, and the body of the ramus in order to avoid damaging the mental nerve during procedures like these. The sensitivity, warmth, and tactile perception of the affected area may change temporarily or permanently as a result of damage to this nerve.[12]

In light of this, the current case report details the unexplained radiography discovery of accessory mental foramina on the left and right sides of the mandible.

2. Case Report

A 35-year-old male patient who had been referred from a private dental clinic for CBCT was seen in the outpatient department. He complained of lost teeth that made it difficult for him to speak and chew food. Permanent first molars were absent from all four quadrants of the intraoral examination. The patient received CBCT as a radiologic examination as the primary measure after being referred for CBCT evaluation for implant location analysis.

The Care Stream machine produced CBCT scans with multiplanar slices. Axial, sagittal, and three-dimensional reconstructed images revealed bilateral AMF, with one AMF on the right side and two AMF/s on the left. (**Figure 1**a, b, c). The AMFs were also visible bilaterally and in front of the primary mental foreman opening in the axial and rectified panoramic (**Figure 2**) segments. (**Figure 3**a, b, c). On a panoramic view, the AMFs' dimensions were further measured. The mesial AMF on the left side was roughly 0.9x1.7 mm, the distal one measured 1.1x1.4 mm, and the right side measured roughly 1.3x1.4 mm (**Figure 4**).

Furthermore, the differential diagnosis for the case with nutrient canals took into account a radiographic diagnostic of bilateral AMFs and partially edentulous maxillary and mandibular arches.

Figure 1: 3D reconstructed CBCT images – labial anterior, left & right side showing bilateral AMF's. Yellow arrows show AMF's and Red arrows show actual MF

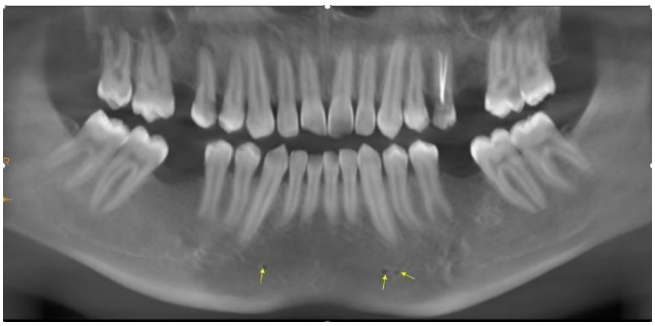

Figure 2: Reconstructed panoramic image showing bilateral AMF's

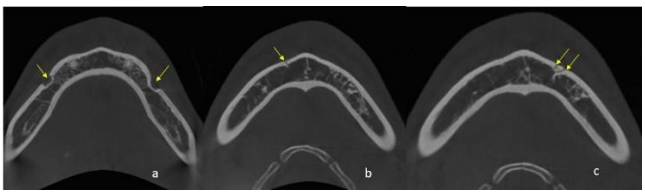

Figure 3: Axial images showing bilateral AMF's and their openings on the respective sides

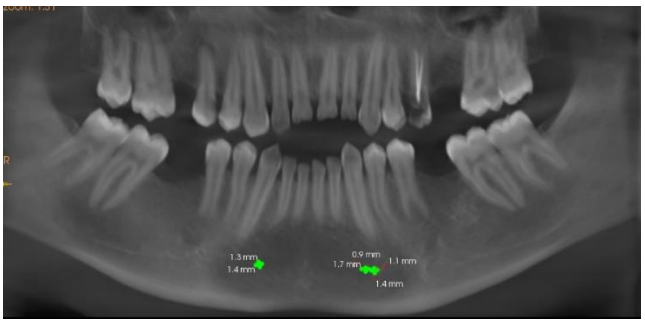

Figure 4: Reconstructed panoramic image showing the dimensions of the AMF's bilaterally

3. Discussion

The mental foramen can be reached by the mental nerve in a variety of ways. The "accessory branch of the mandibular canal" refers to the continuity between the accessory mental foramina and the mandibular canal.[9] There are some anatomical peculiarities and intricacy in the mental foramen area. MF did not fully form until the 12th week of pregnancy, when the mental nerve splits into several fascicules.[13] The AMF is thought to form as a result of the mental nerve dividing before the MF is complete. Differentiating between the nutritional foramen and the AMF is essential. As shown in this instance, the mandibular canal is the source of the

AMF. However, the alimentary foramen is rather small and does not originate from the mandibular canal.[14]

Ethnic groups experience AMF at varying rates. 9.7% of Melanesians, 5.7% of Black Americans, 3.6% of Arabs, 3.3% of Greeks, 3.0% of Hungarians, 2.6% of French, 1.5% of Russians, and 1.4% of White Americans are found to have double mental foramen. Bilateral variants are uncommon, while unilateral variants are prevalent. Our case fell into the uncommon category of bilateral AMFs.[15] According to Sawyer,[16] the prevalence of AMF is higher in boys than in females when the entire population is taken into account. Given that the patient is male, this result is in line with the current investigation.

A three-dimensional reconstitution of the buccal cavity and several slices (axial, transversal, and sagittal) of the area under study without superposition is provided by CBCT.[17]

Typically oval in shape, the MF measures 3.4 mm vertically and 4.6 mm horizontally.[18] According to Phillips et al.,[19] the MF is situated at the apex of the mandibular second premolar in 62.7% of the population. However, in our instance, AMFs were seen to be more anteriorly located on the left side at the apex of the first premolar and left mandibular canine, and on the right side between the apex of 42 and 43 regions.

The literature also cites a 1.2% incidence of triple foramina upon examination of radiographics or dry skulls. Being aware of this potential beforehand can assist adjust the surgical strategy to reduce the danger of nerve damage.[1] The first instance of triple mental foramina at the right side of the premolar area was documented by Ramadhan A et al.[20] This condition was found during the ostheosynthesis and repositioning of a mandible fracture.

AMF is more frequently observed on the buccal or labial side of the jaw, according to the research. However, Neves FS et al.,[21] documented a rare instance of AMF on the mandibular lingual cortical bone in 2010. AMFs were found on the buccal side in the current instance.

Three AMFs associated to the mandibular canal were found in two adult patients who were submitted for a Cone-Beam Computed Tomography (CBCT) evaluation, according to Cartes G & Garay I et al.[22] One patient had a unilateral AMF on the right side, while the other patient had bilateral AMFs. The AMFs were found in the premolar region, either superiorly or distally to the MF. Their mean diameter was 1.23 (±0.45) mm, and their mean distance from the mandibular foramen to the AMF was 3.3 (±1.5) mm additionally, it was determined that CBCT should be acquired before mandibular procedures in order to detect the presence of auxiliary mental foramen and prevent hemorrhage or neurosensory impairment.[22]

Avsever K et al.,[23] observed 41 (8.5%) accessory mental foramen alterations on 480 CBCT pictures, with 208 (43.33%) of the patients being female and 272 (56.66%) being male. Out of the 480 CBCT images taken into consideration for the study, the patients' ages ranged from 18 to 84. Accordingly, a male patient was the subject of the current case.

According to Qader OA et al.,[24] a 41-year-old man's CBCT scan showed an AMF on the right side of his jaw. However, using a sample of 260 dry jaws, Mejias AB et al.[25] identified the presence of AMF in Chilean dry jaws. They were able to classify these jaws as accessory MFs by examining and measuring them to ensure that they complied with the literature's declared presence of AMF, which was between 0.74 mm and 0.89 mm.

Aljarbou F et al.,[26] used 603 CBCT scans to assess the location and incidence of AMF in a Saudi population. Nearly equal numbers of AMFs were found on both sides, with 9.95% of scans having an AMF (n = 60). Out of the scans, only four instances (0.66%) of a second AMF were found. There were no variations in the diameters of the AMFs, however males had considerably larger MFs on both sides than females ($P > 0.05$). The inferior and posterior regions of the MF were where the AMFs were most frequently found. The MF and AMF were separated by a range of 2.32 to 5 mm. However, AMFs were positioned anteriorly and inferiorly to the genuine MF in this instance, bilaterally.

It is nevertheless common to overlook the existence of anatomical changes in the mandible or maxilla. It is crucial to emphasize that presurgical imaging tests can detect these variances, allowing for more precise planning and a better chance of successful treatment. CBCT is crucial to this process since traditional radiography might not be able to identify changes.[5,25]

4. Conclusion

AMF is a rare deviation of normal anatomy. Furthermore, reducing the chance of problems and improving knowledge of potential anatomical factors that may encourage neurosensory disruption in the treatment area are essential.

5. Source of Funding

None.

6. Conflict of Interest

None.

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