Abstract

Introduction
Mental foramen is present on the anterolateral aspect of the body of the mandible. Mental nerve and vessels pass through it and supply the area from canine to first molar. The mental nerve is the neurosensory nerve. Foramen present on the body of the mandible other than the mental foramen is considered as accessory foramen. This study reports a case of unilateral variation of the mental foramen.

Case report
During the anatomical teaching curriculum, we observed an accessory mental foramen on the right side of a dried mandible. Morphometric analysis of mental foramen and accessory mental foramen from various anatomical landmarks was done and results were tabulated.

Discussion
Variations in the number of mental foramen are important when the premolar region is targeted for surgical intervention like osteotomy, root canal treatment and maxillofacial surgeries. Determination of implantation site and achievement of complete nerve block in that region depends upon the anatomical position and possible variation of mental foramen.

Conclusion
Variations in number of mental foramen is not uncommon. The knowledge of accurate position of MF is important to avoid damage to neurovascular bundles passing through it and also to achieve absolute anaesthetic effect at the anterolateral mandibular region.

Unilateral variation of the mental foramen

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Introduction
Mental foramen (MF) is present bilaterally on the anterolateral aspect of the mandible. It is present below the alveolar margin. The MF is an important anatomical landmark for dental surgeons planning for periapical surgery in the mental region as well as for the local anaesthesia in the anterolateral mandibular region. The neurovascular bundle (mental nerve and vessels) emerges out through the MF. The mental nerve is the sensory nerve supplying the chin, lower lip and gingiva. The mental nerve is coming out from the MF and divides into four branches named as angular, medial and lateral inferior labial and mental branch.

Up to the 12th gestation week, the MF remains incomplete. When the mental nerves ramify into various fascicles before the formation of MF, an accessory foramen is formed to provide an exit to these fascicles. Accessory MF (AMF) carries the mental branch and the medial inferior labial branch. It is also important to differentiate the AMF from nutritious foramen. Nutritious foramen is not related with the mandibular canal but AMF always takes origin from the mandibular canal. Incidence of AMF varies between ethnic groups. A previous study reported by Balcipoglu and Kocaelli revealed no gender differences in the variations of number of MF. This study reports a case of unilateral variation of the MF.

Case report
During osteology demonstration curriculum for undergraduate medical students in the department of anatomy, we came across of dried mandible of unknown sex having double foramina on the right side of the mandible (Figure 1). No accessory foramen was observed on the left side of mandible (Figure 2). Digital calliper was used to measure the dimensions and position of MF and AMF. The relation of MF with lower teeth and its position in relation to symphysis menti, the posterior border of the ramus of the mandible and lower border of the body of the mandible was measured.

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Figure 1: Showing MF and AMF on right side of mandible.
mandible was observed. The distance between AMF and MF was also measured (Table 1).

**Discussion**

Prevalence of AMF is variable among ethnic groups and is reported as follows: 2.6% in French, 1.4% in American white, 5.6% in American black, 3.3% in Greek, 1.5% in Russians and 9.7% in Melanesians. Among Japanese it was slightly higher; 6.7–12.5%.5

Three AMF were observed in a study conducted on 100 dried mandibles of the South Gujarat population.6 Triple MF was also reported by Ramadhan et al.7 in 2010 during surgical treatment of mandibular fracture. Gershenson et al.8 observed 0.67% incidence of triple foramina in 525 dried mandibles. Katakami et al.9 examined 150 patients retrospectively using limited cone beam computed tomography and found 16 dual foramina, one triple MF unilaterally. V De Freitas et al.10 examined 1435 mandibles i.e. 2470 sides and found three sides of Mandible devoid of MF.

Thus, the variations in the number of openings in the mental region also varied. Most of the time a single foramen is present on both sides of the body of the mandible but it may double or triple or rarely be absent.

**Clinical significance**

Mental injection or mental nerve block is given to achieve complete anaesthesia in the region of the anterior teeth including premolars and canines. It is important to consider the position of the MF and its morphological variations for the effectiveness of anaesthesia.11

While performing surgical procedures below the second premolar tooth it has to be kept in mind that there could be two mental nerves as observed by Sahin et al.12 during maxillofacial surgery in a trauma patient.

Before coming out of the MF, the nerve loops in to the body of the mandible so the extent of the loop can affect the position of the implant, therefore, panoramic radiograph should be taken to assess the proper location for the implant placement.12 Wang et al.13 observed the average distance between the upper border of the MF and the bottom of the lower second premolar is about 2.50 mm. While performing root canal treatment in this region, the mental nerve could be injured due to close proximity to the lower part of the premolars.

**Conclusion**

After reviewing the literatures, it can be concluded that variations in number of MF is not uncommon. If any surgery is planned in the area of canine to first molar tooth, one should always keep in mind these variations. Precise identification of these variations could be done by using advanced diagnostic techniques like Q-speed prospiral computed tomography (CT) scanner, 3D-CT and spiral CT. The knowledge of accurate position of MF is

**Table 1** Positions and dimensions of MF and AMF

<table>
<thead>
<tr>
<th>Parameters</th>
<th>MF (Right side) mm.</th>
<th>MF (Left side) mm.</th>
<th>AMF mm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from symphysis menti</td>
<td>30</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>Distance from posterior border of ramus of mandible</td>
<td>57</td>
<td>60</td>
<td>53</td>
</tr>
<tr>
<td>Distance from lower border of mandible</td>
<td>17</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Size: Vertical diameter</td>
<td>1.5</td>
<td>1.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Horizontal diameter</td>
<td>1.5</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Shape</td>
<td>Round</td>
<td>Round</td>
<td>Oval</td>
</tr>
<tr>
<td>Distance of AMF from MF</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Position of foramina with respect to lower teeth</td>
<td>Between 1st and 2nd premolar</td>
<td>Below 2nd premolar</td>
<td>Between 1st and 2nd premolar</td>
</tr>
</tbody>
</table>

Figure 2: Front view of mandible showing AMF unilaterally and MF bilaterally.
important to avoid damage to neurovascular bundles passing through it and also to achieve absolute anaesthetic effect at the anterolateral mandibular region.

References