Anatomical Variations of Mental Foramen and Accessory Mental Foramen

Ronak Zarei 1, Reihane Sied Ebrahimi 1, Gholamreza Dashti 2, Majid Pourentezari 3, Mostafa Peyvandi Karizbodagh 1*

1. MSC Student of Anatomical Sciences, Isfahan University of Medical Science, Isfahan, Iran
2. Department of Anatomical Sciences and Molecular Biology school, Isfahan University of Medical Science, Isfahan, Iran
3. PhD student of Anatomical Sciences, Isfahan University of Medical Science, Isfahan, Iran
* Corresponding Author: E-mail: mostafapeyvandi99@yahoo.com

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ABSTRACT

Aim: The mental foramen is a small foramen which is located in the antero-lateral aspect of the body of the mandible. It is situated midway between the upper and the lower border of the mandible and it transmits the mental nerve and the vessels. The knowledge on the anatomy of the mental foramen is very important in clinical dentistry and in surgical procedures which involve that area.

Material and Methods: Our study was conducted on 50 adult dry human mandibles from the Department of Anatomy, Isfahan University of Medical Science. Irrespective of age and sex. The location, shape, orientation and the presence of the accessory mental foramen were studied by visual examination. The size and position of the mental foramen were measured by using a digital vernier caliper.

Results: Bilateral mental foramina were presented in all 50 mandibles. Accessory mental foramina were found in 6% on left side, 4% on right side and nil bilaterally. Mental foramina were predominantly rounded. The percentages of locations of mental foramina below the apex of second premolar, between first and second premolars and between second premolar and first molar were found as 69.2, 18.1 and 10.4, respectively. Accessory mental foramina were located 0.66 mm lateral to mental foramen and below the apex of first molar tooth.

Conclusion: This study may supplement very useful new data of variations in incidence, position, shape and size of mental and accessory mental foramina which may help the surgeons, anaesthetists, neurosurgeons and dentists to help carrying out surgical procedures successfully.

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Introduction

The mental foramen (MF) is an important landmark in dentistry and located in the body of the mandible, midway between the inferior and the alveolar margins of the body (1,2). Normally, MF is located below the interval between the premolars. It may lie between the apices of lower premolars, below the apex of second premolar. Mental nerve and vessels pass through mental foramen (3). Most of the mental foramina are orientated postero-superiorly (4).

Variations in the position of the MF have been reported by many authors in different ethnic groups (5,6) and various shapes have also been noticed (7).

Identification of mental foramen is important for dental surgeons in nerve block and surgical procedures like apical curettage of mandibular premolars, amalgam filling, periodontal surgery etc. to avoid injury to neurovascular bundle (3).

Any foramen which is in addition to MF is considered as an Accessory Mental Foramen (AMF) and it is usually located below the 1st molar teeth (9). This accessory mental foramen may transmit the branches of the mental nerve.

The precise knowledge on the variations in the position, shape, and the size of the mental foramen and the presence of the accessory mental foramen will facilitate the dental surgeons to apply nerve block in different surgical procedures involving lower jaw. It is also essential to have an effective and a successful anaesthesia during nerve blocks, prior to the surgical procedure.

Material and Methods

The mandibles which were used for our study were procured from the Department of Anatomy, Isfahan University of Medical Science. About 50 adult dry mandibles, irrespective of age and sex, were used for our study. Mandibles of children and elderly population were discarded.
The number, shape and the orientation of the MF were determined by a visual examination. Digital vernier calliper was used to measure the dimensions of MF and AMF to analyse and examine the size and position of MF and AMF.

**Results**

**Position of MF:** Mental foramen was situated below the apex of second premolar tooth in 69.2% of mandibles whereas in 18.1% of mandibles it was observed between first and second premolars. In 10.4% it was found between second premolar and first molar and in 2.3% it was seen below the apex of first premolar.

**Position of AMF:** Position of AMF in the body of mandibles in the right side is situated between first and second premolar in 2 out of 50 mandibles in the right side whereas it was observed below the apex of first molar tooth in 3 out of the same 50 mandibles in the left side. Average distance between MF and AMF was 0.66 mm laterally.

**Incidence, shape and size:** Incidence, shape and size of MF and AMF are presented in Table 1.

<table>
<thead>
<tr>
<th>Foramina</th>
<th>Total number of sides</th>
<th>Incidence</th>
<th>Shape</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right</td>
<td>Left</td>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>MF</td>
<td>50</td>
<td>50</td>
<td>46</td>
<td>41</td>
</tr>
<tr>
<td>AMF</td>
<td>50</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

**Discussion**

Since, there is almost no data available for incidence, shape, size and position of mental and accessory mental foramina in Iran to help carrying out surgical procedures around lower jaw. In the present study, the most common location of MF is below the apex of second premolar tooth in 69.2% of mandibles. The same position of MF was observed by Wang et al.(10)in Chinese, Santini and Land (11) in Chinese and British, Apinhasmit et al.(12) in Thais, and Phillips et al.(13) Its frequency in our study is higher than the others. According to Olasoji et al. (14) in North Nigerians and Aktekin et al. (15) the most common location of MF is between first and second premolars. In our study, this position was found in 18.1% of mandibles. AMF below the first molar was observed under current study similar to rankaya and Kansu, (16)

According to Toh et al. (17), distance between the MF and AMF in three cadavers are 0.67 mm, 2.1 mm and 5.74 mm whereas the authors in present Study observed mean distance of AMF from MF to be 0.66 mm which is matching with the distance observed by Toh et al. (17) in one of the three cadavers. The findings of distances in remaining two cadavers by same authors are beyond the range (0.6-1.5 mm) of these distances of AMF from MF under the present study. This data may save nerve block failure in surgical procedures around AMF.

**Conclusion**

The knowledge on the variations of the mental foramen is important for dental surgeons while they perform endodontic and periodontal surgeries, dental implantations, orthognatic surgeries, etc. Also, the verification on the presence of the AMF would prevent an accessory mental nerve injury during surgery and inadequate paraesthesia. Our present study on the variations in the position, size, shape and the existence of the AMF would be of use, for preventing complications and for better outcomes of the surgical procedures which are related to the mental foramen and the mental nerve.

**References**