

## Morphometric Study of Mental Foramina in Mandibles of Telangana Region

Naveen Kumar S<sup>1</sup>, Ashok Kumar M<sup>2</sup>

### Abstract

**Introduction:** On the anterolateral aspect of mandible, mental foramen is found which transmits mental nerve and vessels. It is the ending of mandibular canal which gives passage for inferior alveolar nerve and vessels. The commonly used injection for anaesthetising the mandibular teeth is the inferior alveolar nerve block. **Materials & Methods:** During osteology demonstrations, we observed accessory mental foramen in 9 (nine) mandibles with varying location with reference to mental foramen's location. We have conducted study on 35 mandibles. **Results:** We observed accessory mandibular foramen above mental foramen in 3 (three) mandibles and behind mental foramen in 6 (six) mandibles. To anaesthetise anterior teeth, the possible way is to introduce anaesthesia besides mental foramen.

**Keywords:** Mental Foramen (MF); Accessory Mental Foramen (AMF); Inferior alveolar nerve; Nerve block; Cone beam computed tomography; Sex determination.

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### Introduction

On the anterolateral aspect of mandible, mental foramen is found which transmits mental nerve and vessels. Mandibular canal divides into mental and incisive canal and ends in the mandible through which inferior alveolar nerve and vessels pass. Inferior alveolar nerve gives rise to 2 branches namely mental and incisive within the canal. These branches supply sensory branches to soft tissue of chin, lower lip and gingival region. These branches originate from mental nerve which emerges from

mental foramen on the ipsilateral side of the mandible [1].

Most useful and common injection for anaesthetising the mandibular teeth is inferior alveolar nerve block. To anaesthetise the anterior teeth including premolars and canines, it is possible to avoid giving inferior alveolar nerve block by injecting anaesthetic solution adjacent to mental foramen. To localise the important neurovascular bundle, the knowledge of position and morphological variation of mental foramen is important [2].

Mental foramina are usually observed while giving local anesthesia in order to produce mental nerve block which in turn is required in osteotomies required for various maxillofacial and orthognathic surgeries and for placing dental implants. During these procedures, the mental neurovascular bundle is prone to injuries. So, it is very important to locate its position accurately and reliably so as the occurrence of iatrogenic injuries can be prevented [18].

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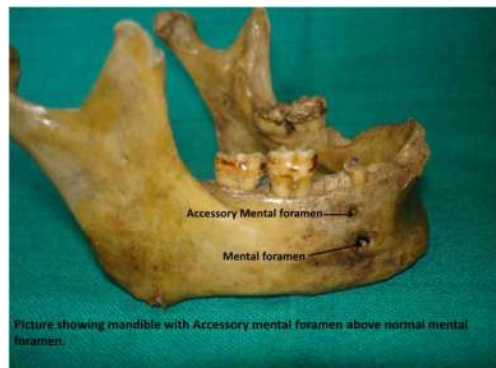
Accessory Mental Foramen (AMF) can be defined as any foramen found in addition to normal Mental Foramen (MF). To achieve complete anesthesia, the knowledge of position and incidence of AMF will be helpful for dental surgeons and also useful in performing periapical surgery [2]. Variations in the position of MF are very rare but variations in terms of number have been reported on one or both sides of mandible. These additional foramina observed in the vicinity of MF are termed as accessory mental foramina (AMF). Finding AMF are said to be a rare anatomical variation. If found, they give passage to myelinated nerves, one or more arterioles and venules. Accessory mental foramen which passes through AMF is considered to be a branch arising from inferior alveolar nerve which innervates the mucous membranes, skin of the corner of the mouth and the median labial region [15].

### Materials and Methods

Study was done on 35 dried human mandibles of unknown sex in Dept of Anatomy in Shadan Medical College, Hyderabad. Position, shape and number of Accessory Mental Foramen (AMF) were measured and documented well. The positional relation of AMF with MF was observed.

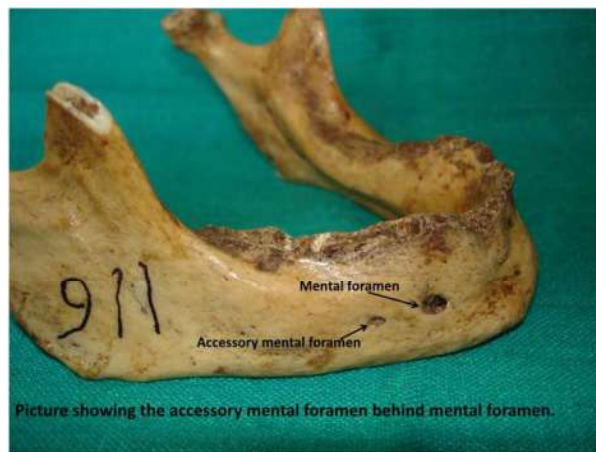
### Results

We found most usual position of mental foramen is below 2<sup>nd</sup> premolar in 35 specimens. Regarding the shape, we detected round mental foramen in 95% of mandibles and oval in 5% of mandibles. With respect to accessory mental foramen, we observed AMF in 9 mandibles of which 4 are bilateral and 5 are unilateral. In 3 mandibles, we observed accessory mental foramen above mental foramen. We found the mean diameter of accessory mental foramen (AMF) ranged from 0.5-1.2 mm.



**Fig. 1:** Picture showing mandible with accessory mental foramen above normal mental foramen.

In 6 skulls, accessory mental foramen was observed behind normal mental foramen.



**Fig. 2:** Accessory Mental Foramen (AMF) behind the normal Mental Foramen (MF).

### Discussion

The only movable bone of facial skeleton is mandible and it forms almost inferior half of the face. Mandible has got functional and cosmetically significance and it contributes to facial contour. In entire vertebrate history, the evolution of mandible has evoked greater interest among researchers. One of the earliest innovations in the evolution of vertebrates belongs to mandible [17]. It is interesting to note that mental foramen and supraorbital notch lie in same vertical line [16]. In the present study, shape of Mental Foramen (MF) was round in 95% of mandibles. According to Singh & Srivastav et al. (2010), the most common shape of MF was round in 94% of mandibles. Al-Khateeb et al. (2007) reported that majority of MF were round in shape similar to present study. The position of AMF was variable in relation with regular MF. In three mandibles, AMF was about 2 mm above MF and in 6 mandibles, AMF was behind MF [2].

In the present study, we observed 9 mandibles with AMF, so the rate of incidence was 12.85%. According to Gershenson et al. (1986), AMF was present in 2.8% Israeli mandibles. In Negro and Maori mandibles, highest incidences of AMF were reported [3].

Study by RK Shukla et al. (2015) [6] stated that they have observed oval shaped mental foramen (MF) was 87.1% on right side and 88.6% on left side. Janardhan Rao et al. (2017) [11] observed oval shaped foramen in 69.28% of mandibles and rounded in 30.71% of mandibles. In our study, we didn't get any disparity on sides and it is uniform

on both the sides. But, in our study, we observed oval shaped mental foramen only in 5% mandibles.

SS Bala (2017) et al. [7] found Accessory Mental Foramen in 2 cases. In our study, we observed accessory mental foramen in 9 cases.

Raj kohila et al. (2018) [15] observed AMF was either superomedial or inferolateral to the mental foramen. In our study, we didn't observe such position but AMF was either posterior or inferior to MF. They reported the average mean diameter of AMF ranged from 0.5 - 1 mm where as in our study we observed the range extended between 0.5 - 1.2 mm.

Gulrez Nadeem et al. (2018) [16] observed majority of mental foramina shape as oval where as in our study we observed majority foramina shape as rounded. Their study didn't report any presence of accessory mental foramen (AMF). In contrast, in our study we observed accessory mental foramen in 9 cases. The same study shown that the relation of accessory mental foramen to mental foramen is postero superior, but in our study we couldn't find such relation of AMF to MF. Regarding the transverse diameter, this author reported mean transverse diameter of 3.23 mm. However, in our study this diameter ranged from 0.5 - 1.2 mm only.

Deepthi N et al. (2018) [18] observed single mental foramen in 88.5% of cases. Regarding our study we couldn't find a mandible with single mental foramen. Their study witnessed the majority mental foramen shape as oval shaped where as we found round shaped mental foramen in majority of mandibles.

LBL Prabodha and BG Nanayakkara (2006) [19] reported the average mean diameter of AMF was 1.7 mm, where as in our study it was between 0.5 mm - 1.2 mm. They also opined that the comparative size of mental foramen and accessory mental foramen was slightly higher in Sri Lankan population.

Farzad Rezaei (2018) [20] conducted their study on Iranian mandibles. They reported the common location of mental foramen was in the line of 2<sup>nd</sup> premolar. This finding coincided with our study.

Lubis MN and Anfelia (2018) [21] conducted their study on panoramic radiographs of mandibles to determine the sex. They have observed the mean transverse diameter of mental foramen was similar in males and females. However, we didn't consider this parameter as this study was done on dry mandibles.

Ewa Zmysłowska-Polakowska et al. [22] reported that there is no statistical difference in appearance of AMF and sex. However, we could not study the

relation between sex and appearance of AMF as the study was done on mandibles of unknown sex.

**Table 1:** Showing comparisons of our study with different authors.

Author	Shape of mental foramen	Accessory mental foramen
Singh & Sri Vastav (2010)	Round (94%)	-----
Al Khateeb (2007)	Round	-----
Gershenson (1986)	-----	2.8%
R K Shukla (2015)	Oval (87.1%)	----
Janardhan Rao (2017)	Oval (69.28%) Round (30.71%)	-----
Bala SS (2017)	-----	4.87%
Present study	Round (95%) Oval (5%)	4 (Bilateral) 5 (Unilateral right)

## Conclusion

This study findings will be of great help to dental surgeon. Priya P. Roy et al. suggested that avoiding injury of mental nerve while doing surgery of that region like dental implant, apicouretagge, endodontic treatment etc. [1].

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