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Research Article

# Anatomical Variations of Accessory Mental Foramen: Incidence and Clinical Significance — A Case Study

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## ABSTRACT

Mental foramen (MF) is situated in anterolateral aspect of the body of the mandible, located below the interval between the premolars. It transmits the mental nerve and vessels, which supply the lower lip, chin and gingiva. Any foramen in addition to mental foramen in the body of the mandible is known as accessory mental foramen (AMF). **Aim**: To review the morphological characteristics, incidence, and morphometry of the AMF. Objective: To emphasize its clinical relevance in oral and maxillofacial procedures. **Material and method**: During an anatomical study of mandible, an accessory mental foramen was found. The frequency of the AMF was calculated, and its dimensions and its relationship with different landmarks to the teeth of the mandible and the mental foramen were determined as well. **Result**: Out of 92 mandibles, on right side of body of one mandible an AMF was present.

***Keywords***: *Variation, accessory mental foramen, mandible, mental nerve.*

## INTRODUCTION

The mental foramen is located on the anterolateral surface of the mandible and represents the terminal exit of the inferior alveolar nerve as the mental nerve. It is commonly found near the apices of the mandibular premolars; however, considerable variation exists in its position, shape, and number [1–3]. One such variation is the accessory mental foramen, defined as an additional opening distinct from the main mental foramen and communicating with the mandibular canal or its branches [1,4].

The incidence of AMF has been investigated through studies on dry mandibles, skulls, panoramic radiographs, and CBCT imaging, with reported prevalence ranging from less than 2% to over 12% [2,3,5,6,7]. Ethnic and population-based differences have been consistently documented, including studies from Indian, African, Middle Eastern, and European populations [3,8,9,10]. Despite being relatively uncommon, the clinical relevance of AMF is significant due to its association with incomplete mental nerve block, haemorrhage, and postoperative neurosensory disturbances [5].

This case study aims to highlight an anatomical variation involving an accessory mental foramen and to contextualize its findings with comprehensive reference to existing anatomical and radiological literature.

## MATERIAL AND METHOD

An anatomical study was conducted on Mandible, during which an accessory mental foramen was found. The study was conducted in Anatomy Department of Bharati Vidyapeeth Medical College, Pune. The study was approved by institutional ethical committee Ref: BVDUMC/IEC/93. Study was conducted on 92 dry adult fully ossified human mandible with no deformities. Out of 92 mandibles only on one mandible's right side (unilateral) an accessory mental foramen was found. The frequency of the AMF was calculated along with its unilateral and bilateral occurrence. Vernier caliper was used to measure the dimensions AMF and distances from Mental foramen, Posterior border of mandible, Base of Mandible and symphysis menti.

## RESULT

On the right side of body of one mandible out of 92 an AMF was present as shown in figure 1. It was oval in shape. Incidence of AMF in this study was calculated as 1.09%. Its location was below the first Premolar. Transverse diameter of AMF was 2.3 mm while the vertical diameter was 1.6 mm. Distance of AMF from Mental foramen was 4.7mm and from Posterior border of Mandible was 61.9mm. Distance of AMF from Base of Mandible was 20.8 and from Symphysis Menti was 20.5mm.

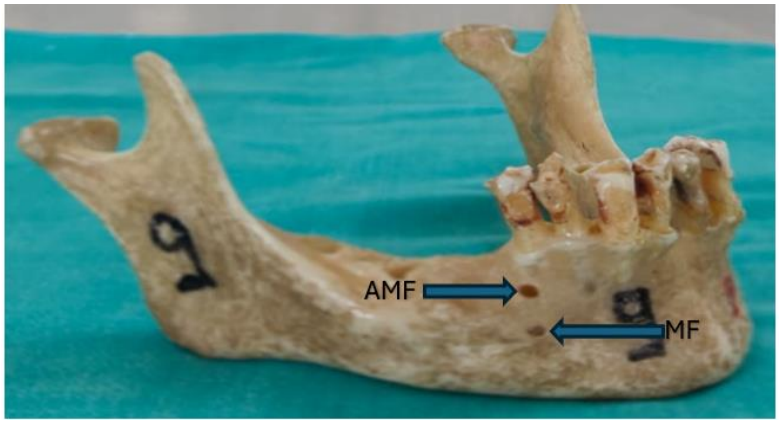


**Figure:1**

## DISCUSSION

Dry mandible studies have reported variable incidence rates, with Gupta and Soni documenting accessory mental foramina in Indian mandibles, while Singh and Srivastav observed similar findings in adult human skulls [2,3]. South Indian population studies further support these observations, emphasizing unilateral predominance with occasional bilateral presentation [9]. Rare bilateral accessory mental foramina have been described in isolated case reports, underscoring the anatomical unpredictability of this variation [6,11].

Mental nerve separates into several fasciculi at the time of formation of mental foramen during 12$^{th}$ gestational week. It has been suggested that early separation of nerve could be the reason for formation of accessory mental foramen.[4]

The accessory mental foramen is typically smaller in diameter than the primary mental foramen and is most frequently located posterior, inferior, or superomedial to it, although positional variability has been widely reported [1,8,9]. Paraskevas et al. proposed that AMF results from early branching of the mental nerve prior to its emergence from the mandibular canal, leading to the formation of a separate bony canal and foramen [1].

Recent CBCT-based studies have shown increased detection rates, particularly in clinical populations undergoing implant planning [12,13]. Several authors have reported that panoramic imaging may fail to detect smaller accessory foramina, leading to underestimation of their prevalence [14]. Radiological studies demonstrate that CBCT is superior to panoramic radiography in identifying AMF, owing to its three-dimensional visualization and elimination of superimposition [8,14,15]. Clinically, the presence of an AMF has direct implications for mental nerve block anaesthesia. Sevmez et al. reported that accessory foramina may harbour nerve branches capable of maintaining sensation despite conventional anaesthesia techniques [16]. Additionally, unrecognized AMF during implant placement or surgical procedures may result in nerve injury, persistent paraesthesia, or bleeding complications [5,17]. Morphological studies on double mental foramina further emphasize the importance of recognizing such variations to ensure safe surgical margins [17].

The present case aligns with previously reported anatomical findings and reinforces the necessity of careful preoperative assessment, particularly in anatomically sensitive regions of the mandible.

## CONCLUSION

The knowledge about variability in position of mental foramen and presence of accessory mental foramen is important in order to avoid nerve damage in connection with surgical procedure and to achieve complete effect of anaesthesia after mental nerve block. Pre-surgical planning with 3D-CT imaging is recommended for procedures involving the mandible to accurately identify its presence and location, ensuring comprehensive anaesthesia and preventing neuro vascular complications. The possibility of post-surgical hypoesthesia is also minimized whereas the clinician has the opportunity to apply more adequate local anaesthesia.

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