ORIGINAL ARTICLE

STUDY OF ANATOMICAL VARIATIONS AND INCIDENCE OF MENTAL FORAMEN AND ACCESSORY MENTAL FORAMEN IN DRY HUMAN MANDIBLES

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ABSTRACT

Objectives: To provide anatomical information on the position, morphological variations and incidence of mental foramen and accessory mental foramen as they are important for dental surgeons, anaesthetists in nerve block and surgical procedures to avoid injury to neurovascular bundle in mental foramen area.
Method: The present study was conducted using 120 dried human mandibles of both sexes. Size, shape and position of mental foramen and accessory mental foramen were determined using digital vernier calliper.
Results: Mental foramen was present in all observed mandibles and it was bilateral in position. Accessory mental foramen was present in 8 mandibles and was unilateral in position.
Conclusion: The knowledge about variation in size, shape and position of mental foramen and presence of accessory mental foramen may be helpful to the dental surgeons to achieve full anaesthesia after nerve block.

Key words: mental foramen (MF), accessory mental foramen (AMF), mandible, premolar tooth

INTRODUCTION

Mental foramen is a small foramen situated in anterolateral aspect of the body of the mandible. Normally, mental foramen is located below the interval between the premolars. It transmits mental nerve, artery and vein. Mental nerve is a branch of inferior alveolar nerve which supplies sensation to lower lip and the labial mucosa and lower canines and premolars. The most useful injection for anaeathetising the mandibular teeth is the inferior alveolar nerve block. To anaesthetise the anterior teeth, including the premolars and canines, it is possible to avoid giving inferior alveolar nerve block by injecting anaesthetic solution adjacent to the mental foramen. So the study of position and morphological variation of mental foramen is very important because it will be helpful to localise the important neurovascular bundle passing through the mental foramen.

Any foramen in addition to mental foramen in the body of the mandible is known as accessory mental foramen. Accessory mental foramen transmits the accessory branch of mental nerve. So the knowledge of its position and incidence is helpful to dental surgeons to achieve complete anaesthesia because if this nerve is not blocked, anaesthesia will be incomplete. This knowledge will also helpful to prevent accessory nerve injury during periapical surgery.

MATERIAL AND METHODS

This study was carried out using 120 dried human mandibles of both sexes in department of anatomy, Medical College, Baroda and GMERS Medical College, Gotri, Baroda to determine the position, size, shape and number of MF and AMF. Digital vernier 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 the symphysis menti, the posterior border of ramus of the mandible and the lower border of the body of mandible was observed. The position of AMF in relation with MF was observed.

RESULTS

Position of MF in relation with lower teeth

MF was situated below the apex of 2nd premolar tooth as shown in **Figure 1** in 75.8% of mandibles, whereas in 12.2% of mandibles it was situated between 1st and 2nd premolars. In 8.3% of mandibles it was situated

below the apex of 1st premolar tooth and in 3.33% of mandibles it was situated below the 1st molar tooth.

Figure 1: Showing most common position on mental foramen below the apex of 2nd premolar tooth.

Relation of MF with other parameters is as follows:

Table:1-Relation of mental foramen with other parameters

Parameters	Mean distance of MF from parameters in mm
Symphysis menti	29.12
Posterior border of ramus of mandible	76.16
Lower border of body of mandible	14.45

Position of AMF

AMF as shown in **Figure 2** was present in 8 out of 120 mandibles. Positions of AMF with relation to MF were variable. It was observed that AMF were situated below the premolars and 1st molar. Average distance between AMF and MF was 4mm. AMF was unilateral only; it was situated on right side in 5 mandibles and on left side in 3 mandibles.

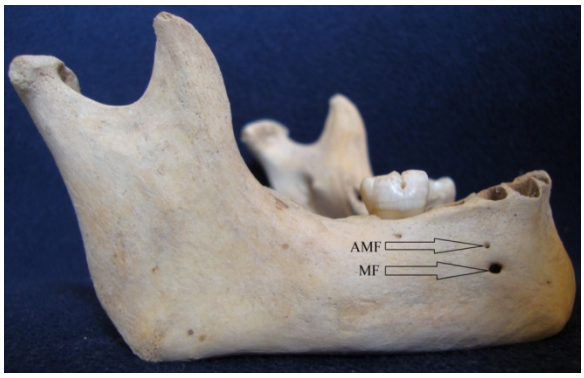

Figure 2: Showing AMF and MF in the body of mandible

Shape and size of MF

240 sides of 120 mandibles were observed. Round shape of MF was observed in 89% of sides while rest were oval in shape. Average size of MF was 2.62mm i.e. maximum diameter, whereas average size of AMF was 1mm.

Incidence of MF and AMF

MF was present in all 120 observed mandibles and was bilateral in position whereas AMF was present in 8 out of 120 observed mandibles, i.e. 6.6% of the mandibles and was unilateral in position.

DISCUSSION

In the present study, the most common position of MF was below the apex of 2nd premolar tooth in 75.8% mandibles. Comparison of most common location of mental foramen with other studies is as follows:

Table 2: Comparison of location of mental foramen with other studies

Authors	Location of MF	% of most common location of MF	Race
Wang et al[9](1986)	Below the apex of 2nd premolar	58.98%	Chinese
Santini & Land et al[8](1990)	Below the apex of 2nd premolar	52.90%	British
Olasoji et al[7](2004)	Between 1st & 2nd premolar	------	Nigerian
Apinhasmit et al[4](2006)	Below the apex of 1st premolar	------	Thais
Singh & Srivastav et al[3](2010)	Below the apex of 2nd premolar	68.8%	Indian
Present study	Below the apex of 2nd premolar	75.8%	Indian

In British mandibles, MF was situated below the apex of 2nd premolar in 52.90% by Santini & Land *et al.*[8](1990). Wang *et al*[9](1986) mentioned that MF was located below the apex of Chinese in 58.98%. According to Olasoji *et al.*[7](2004) MF was situated between 1st and 2nd premolar in Nigerian. Apinhasmit *et al.*[4](2006) observed that MF was below the apex of 1st premolar in Thias. Position of MF was also observed below the apex of 2nd premolar in 68.8% on mandibles in Indian race by Singh & Srivastav *et al.*[3](2010)

In present study, shape of MF was round in most of the mandibles. According to Singh & Srivastav *et al.*[3](2010) the most common shape of MF was round in 94% mandibles. Al-khateeb *et al.*[11](2007) observed that majority of MF were round in shape similar to the present study. In present study, there were 8 mandibles with AMF so the incidence was 6.6%. According to

Gershenson *et al.*[12](1986), AMF was present in 2.8% Israeli mandibles. Highest incidences of AMFs were reported in Negros and Maori mandibles.

The position of AMF was variable in relation with regular MF. In one mandible it was just superior to the regular MF at 5mm distance. One of the AMF was 4mm behind the regular MF. One AMF was superolateral to the MF at 4.5mm distance. AMF were smaller in size than regular MF.

Comparison of the results of parameters of this study with the other studies is as follows:

Table:3- Comparison of the results of parameters with the other studies

Mean distance from	Apinhasmit et al[4](2006)	Prabodha et al[5](2006)	Present study
Symphysis menti	28.83mm	26.52mm	29.12mm
Posterior border of ramus of mandible	68.88mm	65.38mm	74.16mm
Lower border of body of mandible	14.88mm	12.25mm	14.45mm

In an adult with the advancement of age mental foramen is moved towards the superior border of mandible. This is mainly because of the loss of teeth and alveolar bone resorption. There is a significant variation of the position of mental foramen seen with age.

CONCLUSION

The anatomical variability of the position of the mental foramen should always be considered when performing periodontal or endodontic surgery in the area from canine to root of first molar tooth.

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.

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