

STUDY OF ANATOMICAL VARIATIONS OF MENTAL FORAMEN IN DRY ADULT HUMAN MANDIBLES AND ITS CLINICAL IMPORTANCE IN MAHARASHTRIAN POPULATION

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ABSTRACT:

Background: Morphometric study of mandible is important for Oral and maxillofacial surgeon in administering the Local anesthesia while performing the oral, maxillofacial, periodontal, implant, apical curettage and endodontic procedures in the mental region of the mandible. Materials and **Methods:** Present study was carried out using 30 dried adult human mandibles of unknown sex obtained from Bone Bank of the Department of Anatomy, IIMSR, Warudi, Jalna. Compass asthesio meter was used to measure the shape, location and direction of opening of mental foramen both sides of mandibles.

Results: The mean distance between the mental foramen and symphysis menti for right side was 24.18 mm±1.20 and for left side was 23.3 mm±1.032. The mean distance between mental foramen and posterior border of ramus of mandible for right side was 63.33 mm±1.03 and for left side was 65.54 mm±1.033. The mean distance between mental foramen and alveolar crest for right side was 15.8 mm±1.05 and for left side was 16.23 mm±1.023. The mean distance between the mental foramen and base of mandible for right side was 15.23 mm±1.054 and for left side was 15.8 mm±1.076. The shape of the mental foramen is round in 78.33% and oval 23.83%.

Conclusion: The mental foramen and the incidence of accessory mental foramen will provide helpful information to the oral and maxillofacial surgeon, oncosurgeon for performing procedure on the mandible. That prevents complications, misinterpretations, also it will help to plan and develop newer techniques for nerve blocks for surgery on mandible

Keywords: Mental Foramen, Accessory mental foramen, double mental foramen, mandible.



INTRODUCTION:

The mental foramen is an opening located on the external surface of the mandible in the region of the mandibular premolars. Mental nerve and vessels pass through mental foramen. Normally, mental foramen is located below the interval between the premolars. However, variations in the location of the foramen have been reported. It may lie

between the apices of lower premolars or below the apex of second premolar.^[1]

Mental foramen is situated in anterolateral aspect of the body of the mandible. It lies below either the interval between the premolar teeth, or the second premolar tooth, midway between the upper and lower borders of the body

of the mandible. It transmits mental nerve, artery and vein. Mental nerve is a branch of inferior alveolar nerve which supplies sensation to lower lip, labial mucosa, lower canines and premolars. The most useful injection for anaesthetizing the mandibular teeth is the inferior alveolar nerve block. To anaesthetize the anterior teeth including canines and premolars it is better to inject the anesthetic solution adjacent to the mental foramen instead of giving inferior alveolar nerve block.^[2] Any foramen in addition to mental foramen in the body of mandible is called accessory mental foramen. It transmits auxiliary nerves to the teeth (from facial, mylohyoid, buccal and transverse cervical cutaneous and other nerves).^[3] The junction between the lower part of the body of the mandible and posterior border of the ramus of the mandible forms the angle of the mandible. It measures about 110° – 115° in adults both sexes.^[4] Mental foramen is important landmark to facilitate diagnostic, surgical, local anesthetic and other invasive procedures of the oral and maxillofacial region. Knowledge of mental foramen and accessory foramen position is helpful to oral and maxillofacial surgeons to achieve

complete anesthesia and also helpful to avoid injury to mental nerve during surgery. Age related changes in gonial angle can be used in forensic odontology, but has received less attention.

MATERIALS AND METHODS:

Present study was carried out using 30 dried adult human mandibles of unknown sex obtained from Bone Bank of the Department of Anatomy, IIMSR, Warudi, Jalna. Compass asthesio meter was used to measure distance, shape, location, direction opening of mental foramen on both sides of mandibles.

Location of mental foramen was identified by using following parameters.

- Distance from mental foramen to mental symphysis.
- Distance between the mental foramen to posterior border or ramus.
- Distance from mental foramen to alveolar crest.
- Distance from mental foramen to base of mental foramen.

RESULTS:

Table 1: Showing the position of mental foramen from various landmarks.

Landmarks	Mean distances on right side (mm)	Mean distances on left side(mm)
Symphysis menti	24.18	23.3
Posterior border of ramus of mandible	63.33	65.54
Alveolar crest	15.8	16.23
Base of mandible	15.23	15.8

Table 2: Shape of mental foramen

Shape	Study results
Oval	23.67%
Round	76.23%

The mean distance between the mental foramen and symphysis menti for right side was 24.18 mm±1.20 and for left side was 23.3 mm±1.032. The mean distance between mental foramen and posterior border of ramus of mandible for right side was 63.33 mm±1.03 and for left side was 65.54 mm±1.033. The mean distance between

mental foramen and alveolar crest for right side was 15.8 mm±1.05 and for left side was 16.23 mm±1.023. The mean distance between the mental foramen and base of mandible for right side was 15.23 mm±1.054 and for left side was 15.8 mm±1.076. Shape of the mental foramen is round in 76.33% and oval 23.67%,

Table 3: Comparison of Shape of mental foramen, our study with the other studies

Shape	Prabodha et al ⁴	Priya et al ⁵	Present study
Oval	66.67%	53.3%	23.67%,
Round	33.33%	34.67%	76.33%

Table 4: Comparison Position of mental foramen present study with the other studies

Landmarks	Prabodha et al ⁴ mm	Sumit et al ¹ mm	Present study Mm
Symphysis menti	26.52	29.12	24.18
Posterior border of ramus of mandible	65.38	74.16	63.33
Alveolar crest	12.15	14.45	15.8
Base of mandible	13.3	13.85	15.23

DISCUSSION:

In 120 adult, dry mandibles studied by Sumit et al the mean distance of mental foramens was measure from symphysis menti, lower border of the body of the mandible and posterior border of the ramus of the mandible was 29.12mm, 14.45mm and 76.16mm. The common position for the mental foramen was in line with longitudinal axis of the lower second premolar was

(75.8%), a position between first and second premolar were (12.2%) and followed by position in line with first molar was (3.33%). Accessory mental foramen was present in 8 mandibles (6.6%). ^[2]

In 80 dry mandibles Lobes et al found that the mean distance of mental foramen measurement from symphysis menti and lower border of the body of the mandible was 26.14mm and 13.83mm respectively.

The most common location of the mental foramen is in position with second premolar followed by the position between the first mandibular premolar and second premolar teeth.^[6]

Ilayperuma et al studied 51 adult dry mandibles found that the mean distance of mental foramen from symphysis menti was 24.86mm. The common position for the mental foramen was in line with longitudinal axis of the lower second premolar (52.94%) followed by a position between first and second premolar (26.47%). In many mandibles, the shape of the mental foramen was oval (59%). Multiple mental foramens was 3.92%.^[7]

Deepa et al studied 100 dry mandibles and they found the mean distance of mental foramen measurement from symphysis menti and lower border of the body of the mandible was found 25.28 mm and 12.13 mm respectively. The common position for the mental foramen was in line with longitudinal axis of the lower second premolar in (81.52%) and position between first and second premolar was (7.7%) and followed by position in line with first molar was (7.9%). Double mental foramen was found in 2.6% of cases. The shape of mental foramen was oval in 92% and rounded in 8% of mandibles.^[8]

Prabodha studied 24 adult dry mandibles quoted that the mean distance of mental foramen measurement from symphysis menti, lower border of the body of the mandible and posterior border of the ramus of the mandible was 26.25 mm, 12.25 mm and 65.38 mm. As for as shape of mental

foramen is concerned it was found oval in 66.67% and rounded in 33.33% of mandibles. Accessory mental foramen was also found in 2 mandibles (8.33%).^[4] A Priya et al study 75 adult dry mandibles and found that the mean distance of mental foramens measurement from symphysis menti was 26.50mm respectively. The commonest position for the mental foramen was in line with longitudinal axis of the lower second premolar was (52%) and second premolar (23.33%). The shape of thel foramen was oval in 53.3% and rounded in 34.67% of mandibles. The opening of mental foramen was posterosuperiorly in 90.67% of mandibles.^[5]

In our study the mean distance between the mental foramen and symphysis menti for right side was 24.18 mm±1.20 and for left side was 23.3 mm±1.032. The mean distance between mental foramen and posterior border of ramus of mandible for right side was 63.33mm±1.03 and for left side was 65.54 mm±1.033. The mean distance between mental foramen and alveolar crest for right side was 15.8 mm±1.05 and for left side was 16.23 mm±1.023. The mean distance between the mental foramen and base of mandible for right side was 15.23 mm±1.054 and for left side was 15.8 mm±1.076. Shape of the mental foramen is round in 76.33% and oval 23.67%, Deepa et al study shows that the shape of mental foramen was oval in 61.2% and rounded in 38.5% of mandibles in most of the studies. Accessory mental foramen was seen in 2 mandibles on right side (5.71%). Double mental foramen was present in 1 mandible

(2%). The mean measurement of angle of the mandible was 128°.

CONCLUSION:

The present study of the mental foramen and the incidence of accessory mental foramen will provide helpful information to the oral and maxillofacial surgeon, oncosurgeon for performing procedure on the mandible. Which prevents complications, misinterpretations. also helps to plan and develop newer techniques for nerve blocks for surgery on mandible.

On observations revealed the presence of accessory foramina in most of the investigated mandibles. The anatomical variations of incidence and position of accessory foramina, this knowledge should be considered to avoid nerve damage and incomplete nerve blocks in various surgical procedures. These foramina may also be used to give additional local anesthesia and In planning autologus graft for implants, knowledge of the foramina positions and incidence of different locations will be beneficial for oral-maxillofacial surgeons.

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The position of the mental foramen is important during clinical practices. Injury to the mental nerve is one of the main complications of surgery of the mandibular canal and mental foramen regions. Our study also helpful for determining the age of the mandible approximately which in turn will help in forensic science related cases and also in anthropological study.

FIGURE:



Fig- 1- Showing the mental foramen in between 2nd premolar and 1st molar teeth. MF- Mental foramen

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