

# Morphometric study of the mental foramen in dry adult human mandibles

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## Abstract

**Introduction:** Mental foramen is the important anatomical landmark situated on the anterolateral surface of the body of the mandible. It transmits mental nerves and vessels. Aim of the present study is to provide the morphometric data of the mental foramen so as to provide the valuable information to the dental surgeon, maxillofacial surgeon and anaesthetists. Study was carried out on 100 dry adult mandibles of unknown sex. We found the shape of mental foramen was oval in 62% and round in 38% of mandibles. The mean transverse diameter was 3.11mm on right side and 3.18mm on left side. The mean vertical diameter was 2.53mm on right side and 2.56mm on left side. The mental foramen was situated below the apex of second premolar tooth in 73% on right side and 75% on left side. The distance between mental foramen and symphysis menti (D1) was 25.81±2.25mm on right side and 25.81±2.11mm on left side. The distance between mental foramen and alveolar border (D2) was 12.42±2.13mm on right side and on left side was 12.51±2.0mm. The distance between mental foramen and inferior border of body mandible (D3) was 12.39±1.25mm on right side and on left side it was 12.27±1.13mm. The distance between mental foramen and posterior border of ramus (D4) was 66.90±4.41mm on right side while on left side it was 65.90±7.96mm. There was no significant side difference either in position or the morphometry of mental foramen.

**Keywords:** mental foramen, mandible, mental nerve, mental vessels, mandibular canal.

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of the inferior alveolar nerve. Normally, mental foramen lies between the apices of lower premolars, mostly below the apex of second premolar<sup>1,2</sup>. But position of the mental foramen vary among racial groups and genders<sup>3,4</sup>. Mental foramen serves as an important anatomical landmark to facilitate surgical, local anaesthetic and other invasive procedures for oral and maxillofacial surgeries but very little attention is given to this region. Understanding the anatomy of this region is essential for performing effective nerve blocks and avoiding injuries to the neurovascular bundles.

## INTRODUCTION

Mental foramen situated in anterolateral surface of the body of the mandible and present half way between the upper and lower borders at both sides. The mental foramen is oval or circular opening and represents the termination of mandibular canal. It transmits mental vessels and nerve. Sensation from the skin of chin, lower lip and labial mucosa is carried by mental nerve, a branch

## MATERIAL AND METHODS

Study was carried out on 100 dry adult mandibles of unknown sex in Department of Anatomy, from Maharashtra. Mandibles with gross pathology, children and elderly population were omitted. The shape, size, position and location of mental foramen were measured on both sides of mandible by using Vernier Caliper. The shape of mental foramen was noted as either oval or

rounded. Mean transverse and vertical diameters were measured. Position of mental foramen in relation to tooth socket was taken and noted as follows;

- P1- At apex of second premolar.
- P2- At apex of first premolar.
- P3- Between first premolar and second premolar.
- P4- Between second premolar and first molar.

Location of mental foramen was noted as follows;

- D1- Distance from mental foramen to symphysis menti.
- D2- Distance from mental foramen to alveolar margin.
- D3- Distance from mental foramen to inferior border of mandible.
- D4- Distance from mental foramen to posterior border of ramus.

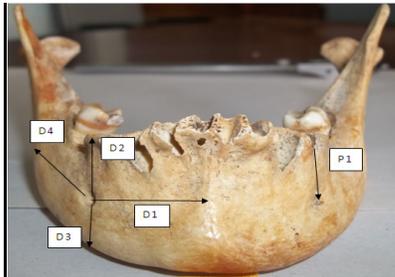


Figure 1: Mean values on right and left sides were compared by using Student't' test

## RESULTS

The following results were obtained:

Table 1: Shape of mental foramen

Shape of MF	Oval	Round
Percentage	62%	38%

Table 2: Size of mental foramen

Diameter	Right side (mean±SD)	Left side (mean±SD)
Transverse	3.11±0.79mm	3.18±0.8mm
Vertical	2.53±0.45mm	2.56±0.4mm

Table 3: Frequency of the position of mental foramen in relation to mandibular teeth socket

Position	Right side	Left side
P1	73	75
P2	3	4
P3	16	15
P4	8	6

Table 4: Location of mental foramen

Parameters	Right side (mean±SD)	Left side (mean±SD)	t value
D1	25.81±2.25mm	25.81±2.11mm	0.02
D2	12.42±2.13mm	12.51±2.0mm	0.30
D3	12.39±1.25mm	12.27±1.13mm	0.70
D4	66.60±4.41mm	65.90±7.96mm	0.76

## DISCUSSION

The various studies were done on the mental foramen in the past using different parameters. In the present study, majority of mental foramen was oval in shape i.e. 62% and only 38% had rounded which was similar to study conducted by Siddiqui AV *et al*<sup>5</sup> (2011) and Shaik HS *et al*<sup>6</sup> (2012). While in contrary to present study Singh R *et al*<sup>7</sup> (2010) found 6% oval and 94% round mental foramen. Ilayperuma I *et al*<sup>8</sup>(2009) found in their study that mean transverse diameter of mental foramen on right side was 3.26mm and on left side 3.41mm while the mean vertical diameter was 2.45mm on right side and 2.60mm on left side. Agrawal DR *et al*<sup>9</sup> (2011) finding were as, mean transverse diameter on right side 3.33mm and on left side 3.25mm and mean vertical diameter on right side 2.15mm and on left side 2.13mm. In the present study mean transverse diameter was found to be 3.1mm on right side and 3.18mm on left side with range of 1.7-5.1mm on right side and 1.4-5.4mm on left side. The mean vertical diameter was 2.53mm on right side and 2.56mm on left side with range of 1.5-3.7mm on right side and 1.5-3.8mm on left side. Position of the mental foramen in relation to mandibular teeth sock *et al* so varies. In the present study the mental foramen was found to be situated below the apex of second premolar tooth (P1) in 73% on right side and 75% on left side. It was present below the apex of first premolar tooth (P2) in 3% on right side and 4% on left side, while between first premolar and second premolar tooth (P3) there is 16% on right side and 15% on left side and in between second premolar and first molar tooth (P4) in 8% on right side and 6% on left side. Agrawal DR *et al*<sup>9</sup> (2011) found position P1 as most common location which was 81.55% on right side and 81.5% on left side. No mandible with P2 position was noted. Siddiqui AU *et al*<sup>5</sup> (2011) found frequency of P1 as 44.08% on right and 46.23% on left side which was quite similar to position P3, 41.93% on right and 35.48% on left side. The mandibular teeth socket gives arbitrary position of the mental foramen. Exact position of the mental foramen can be found by using data obtained from the location of the mental foramen. The distance between mental foramen and symphysis menti (D1) was 25.81±2.25mm on right side with range of 15.7-30mm and 25.81±2.11mm on left side with range of 15.2-30mm. The distance between mental foramen and alveolar border (D2) was 12.42±2.13mm on right side with range of 8-19.3mm and on left side it was 12.51±2.0mm with range of 8-18.5mm. The distance between mental foramen and inferior border of body mandible (D3) was 12.39±1.25mm on right side with range of 9-19mm and on left side it was 12.27±1.13mm with range of 9-17mm. The distance between mental foramen and posterior border of ramus (D4) was 66.90±4.41mm with range of

55-76.7mm on right side while on left side it was 65.90±7.96mm with range of 53.6-74.6mm. Singh R *et al*<sup>7</sup> (2010) findings differs from the present study findings as follows, D1 on right side was 29.3mm and on left side was 30.6mm, D2 on right side was 17mm and on left side was 18.6mm, D3 on right side was 17.3mm and 13.7mm on left side, D4 was 71.8mm on right and 84.7mm on left side. Sankar DK *et al*<sup>10</sup> (2012) noted D1 on right side 27.2mm and 27.7 on left side, D2 on right side as 13.7mm and 16.4mm on left side, D3 as 16.5mm on right side and 14.3mm on left side and D4 as 70.7mm on right as well as left side. There was no statistically significant side difference either in position, location or the size and shape of the mental foramen.

## CONCLUSION

The present study reveals that the most common position of mental foramen is below the second premolar, second most common position is between first and second premolar followed by third most common position between second premolar and first molar and rarely it is found below the apex of first premolar. There are no accurate anatomical landmarks to locate the mental foramen as it cannot be visualized or palpated clinically, still it is localized in relation to lower teeth but it is not always accurate. So, the various parameters from mental foramen help to locate its exact position.

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