

# Morphometric Analysis of Mental Foramen of Dry Adult Human Mandibles of South Indian Population

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## ABSTRACT

**Background:** The present study was conducted for evaluating Mental Foramen of Dry Adult Human Mandibles of South Indian Population.

**Materials & Methods:** The present study was conducted for evaluating Mental Foramen of Dry Adult Human Mandibles of South Indian Population. Fifty dry adult human mandibles with intact teeth were included for the present study. Variable position and shape of the mental foramina was evaluated. The position of the mental foramen was classified in relation to the teeth of the lower jaw, in accordance with Tebo and Telford (1950). All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS Software.

**Results:** Majority of the specimens had type IV relation (Foramen lying on the longitudinal axis of the second premolar) of mental foramen with lower teeth followed by type V (Foramen lying on a longitudinal axis passing between the second premolar and the first molar). Mean dimensions of horizontal diameter of the mental foramen on right side and left side was 4.59 mm and 4.53 mm respectively. Mean dimensions of vertical diameter of the mental foramen on right

side and left side were 3.63 mm and 3.61 mm respectively.

**Conclusion:** Knowledge of morphological and positional variation of mental foramen is significant for isolation of mental nerves and vessels when administering local anesthesia and performing surgeries.

**Key words:** Mental foramen, Morphometric, Mandible.


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## INTRODUCTION

The mental foramen (MF) is the opening through which the mental nerve exits the mandible and is usually located either between the roots of the first and second mandibular premolars or apical to the second premolar. The mental nerve represents one of the terminal branches of the mandibular nerve and divides into three branches supplying the lower lip, cheeks, chin, and the vestibular gingival of mandibular incisors.<sup>1-3</sup> Knowledge of location of foramen in the maxillofacial region is necessary especially in a clinical situation where regional nerve blocks are required for open as well as endoscopic surgical procedures in order to avoid injury to corresponding nerves. A major challenge encountered during open reduction of mandibular fractures is the identification and protection of mental nerve. Prior to surgery knowledge of the exact location may enable effective mental block anaesthesia to be provided. Knowledge of position of the mental foramen and the mandibular canal for various surgical procedures is important.<sup>4-6</sup>

Hence; the present study was conducted for evaluating Mental Foramen of Dry Adult Human Mandibles of South Indian Population.

## MATERIALS & METHODS

The present study was conducted for evaluating Mental Foramen of Dry Adult Human Mandibles of South Indian Population. Fifty dry adult human mandibles with intact teeth were included for the present study. Variable position and shape of the mental foramina was evaluated. Measurement of the distance of the mental foramen (in mm) from different landmarks was done as follows:

- D1: Symphysis menti to the medial margin of the mental foramen
- D2: Posterior border of the ramus of the mandible to the lateral margin of the mental foramen.
- D3: Symphysis menti to the posterior border of the ramus of the mandible

D4: Horizontal diameter of the foramen calculated as  $D3-(D1+D2)$   
 D5: Alveolar crest to the upper margin of the mental foramen  
 D6: Lower border of the mandible to the lower margin of the mental foramen.

D7: Alveolar crest to the lower border of the mandible

D8: Vertical diameter of the foramen calculated as  $D7-(D5+D6)$

The position of the mental foramen was classified in relation to the teeth of the lower jaw, in accordance with Tebo and Telford (1950).<sup>7</sup> I) Foramen lying on a longitudinal axis passing between the canine and first premolar. II) Foramen lying on the longitudinal axis of the first premolar. III) Foramen lying on a longitudinal axis passing between the first and second premolars. IV) Foramen lying on the longitudinal axis of the second premolar. V) Foramen lying on a longitudinal axis passing between the second premolar and the first molar. VI) Foramen lying on the longitudinal axis of the first molar. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS Software.

**RESULTS**

A total of 50 specimens were analyzed. Majority of the specimens had type IV relation (Foramen lying on the longitudinal axis of the second premolar) of mental foramen with lower teeth followed by type V (Foramen lying on a longitudinal axis passing between the second premolar and the first molar). Mean dimensions of horizontal diameter of the mental foramen on right side and left side was 4.59 mm and 4.53 mm respectively. Mean dimensions of vertical diameter of the mental foramen on right side and left side were 3.63 mm and 3.61 mm respectively.

**Table 1: Relationship of mental foramen with lower teeth**

Types	Right side		Left side	
	n	%	n	%
I	0	0	0	0
II	2	4	2	4
III	10	20	9	18
IV	25	50	26	52
V	13	26	13	26
VI	0	0	0	0

**Table 2: Dimensions of mental foramina**

Dimensions	Right side		Left side	
	Mean	SD	Mean	SD
Horizontal diameter of the foramen	4.59	0.12	4.53	1.15
Vertical diameter of the foramen	3.63	0.19	3.61	0.18

**DISCUSSION**

The mental foramen is located on the anterolateral aspect of the mandible, 13-15 mm superior to the inferior border of the mandibular body. The direction of the opening of the mental foramen is outward and upward in a posterior orientation. The mental foramen is most usually single in human; when it is double or multiple, the additional foramen is termed accessory foramen.

The accurate identification of location of MF is important for both diagnostic and clinical procedures. The mental nerve exiting the MF usually has three to four branches for innervation of the soft tissues of the chin, lower lip, facial gingiva and mucosa in the anterior mandible. The clinician is advised to observe a safety distance when performing incisions and osteotomies in the vicinity of the MF.<sup>7- 10</sup> Hence; the present study was conducted for evaluating Mental Foramen of Dry Adult Human Mandibles of South Indian Population.

A total of 50 specimens were analyzed. Majority of the specimens had type IV relation (Foramen lying on the longitudinal axis of the second premolar) of mental foramen with lower teeth followed by type V (Foramen lying on a longitudinal axis passing between the second premolar and the first molar). Virendra Budhiraja et al elucidated the morphological features and morphometric parameters of mental foramen with reference to surrounding landmarks. 105 dry adult human mandibles of unknown sex were observed for position, shape, and number of mental foramina. Their size was measured using a digital vernier caliper and statistically analyzed by mean and standard deviations (SD). In most cases (74.3%), the MF was oval in shape and situated on the longitudinal axis of the 2nd premolar tooth (61% on right side and 59.1% on left side). The mean distance for the right and left sides was measured from various landmarks.<sup>11</sup>

Mean dimensions of horizontal diameter of the mental foramen on right side and left side was 4.59 mm and 4.53 mm respectively. Mean dimensions of vertical diameter of the mental foramen on right side and left side were 3.63 mm and 3.61 mm respectively. In another previous study conducted by Gupta V et al, authors documented information on appearance, size, horizontal and vertical locations of Mental Foramen (MF) in Panoramic Radiograph. 1662 panoramic radiographs were evaluated, of which 245 fulfilled the inclusion criteria. Each radiograph was traced to record the horizontal and vertical locations. The most common appearance of MF was continuous type and the tests showed significant difference with age and gender. The most frequent horizontal location of MF was "location c" with no statistically significant difference with age and gender. The MF was most commonly positioned mesially in relation to the apex of second premolar with no significant differences with gender. The vertical location of the foramen varied drastically with no statistically significant difference in both sides. The difference in dimensions on the left and right sides were not statistically significant.<sup>12</sup>

Udhaya et al, in another study, conducted on 90 adult dry human mandibles from the south Indian population, irrespective of age and sex. The location, shape, orientation and the presence of the accessory foramen were studied by visual examination. The size and position of the mental foramen were measured by using a digital vernier caliper. In a majority of the mandibles, the mental foramen was located at the level of the root of the 2<sup>nd</sup> premolar, midway between the inferior margin and the alveolar margin of the mandible. Most of the mental foramina were oval in shape. The orientation of the foramen was poster.<sup>13</sup>

**CONCLUSION**

Knowledge of morphological and positional variation of mental foramen is significant for isolation of mental nerves and vessels when administering local anesthesia and performing surgeries.

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