

Morphology and Morphometry of Mental Foramen in Dry Adult South Indian Mandibles: A Cross-Sectional Study

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Abstract

Introduction: Knowledge on the mental foramen would be helpful for the dental surgeons while performing various dental procedures. To prevent damage to the mental nerve while performing dental implants, root canal treatments, and orthodontic surgeries.

Materials and Methods: 50 dry adult human mandibles of unknown age and sex.

Results: Mean horizontal, vertical diameters were recorded, and bilateral symmetry was observed. Distance from the symphysis menti and distance from the inferior border were recorded, and there was no significant difference between the right and left sides.

Conclusion: The various parameters as taken in the present study helps the clinician to locate the foramen as there is no proper anatomical landmark for its isolation in mental nerve block and also while performing various dental and surgical procedures.

Key words: Mandible, Mental Foramen, Morphometry

INTRODUCTION

Mental foramen (MF) is an important anatomical landmark to facilitate surgical, local anesthetic, and other invasive procedures for dental surgeons performing periapical surgery in the mental region of the mandible. The MF, from which the mental nerve and vessels emerge, lies below either the interval between the premolar teeth or below the second premolar tooth. MF gives passage to mental nerve, mental artery, and vein. Mental nerve is a branch of inferior alveolar nerve which in turn is a branch of the mandibular nerve. It supplies chin, labial gingiva of lower teeth. The mental artery is a branch of inferior alveolar artery and a branch of maxillary artery. It supplies the chin lower teeth and gingiva. Mental vein, which drains into facial vein, is a part of pterygoid venous plexus.¹

Knowledge on the variations in the position, shape, and the size of the MF would be of much use for dental surgeons while they do surgical procedures on the mandible such as the curettage of the premolars, dental implants, root canal treatments, and orthognathic surgeries.² This study unlike most other studies is done on dry specimens which is no way harmful like the radiographs, which are generally used for morphometric studies. The study is carried out in south Indian population where not much of such knowledge is available.

MATERIALS AND METHODS

This study was performed on 50 dry mandibles collected from department of anatomy. All the mandibles are of unknown sex from South India. Mandibles, which are in a good condition, are included. Broken mandibles and mandibles with resorption at MF were excluded. Digital vernier calipers were used to measure the different parameters. Shape and direction of opening were observed and noted. The following parameters were measured: Horizontal diameter (HD), vertical diameter (VD), distance from symphysis menti (DSM), distance from inferior

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border (DIB) of mandible, and distance between the two foramina (DBF) (Figures 1-4).

OBSERVATION AND RESULT

The average HD was observed to be 2.95 mm; average VD was observed to be 2.23 mm; DSM was found to be 26.30 mm; DIB of mandible was found to be 13.05 mm; the average DBF was found to be 44.55 mm. Student's *t*-test was conducted and $P < 0.05$ was found to be significant (Table 1).

The direction of opening was observed to be posterior superior in 88.57%, superior in 5.71%, anterior superior 4.2%, and anterior inferior in 1.42% of the foramina. The shape of opening was observed to be oval in 70% and round in 30% of foramina. The foramina were found to be oval on both the sides in 20 mandibles; round on both the sides in 6 mandibles and oval on one side, round on another side in 9 mandibles. Accessory mental foramina

were found in 20% of mandibles on the left side and 2.8% of mandibles on both the sides (Table 2).

DISCUSSION

The present study showed that the MF is oval in shape in 70% of foramina and round in 30% of foramina. The results are similar to study of Olivera Junior *et al.*³ It is contrary to the study of Agarwal *et al.* in dry mandibles of Gujarat population which showed 92% oval foramina and 8% round foramina.⁴ The opening of foramen according to present study is posterior superior in majority of mandibles in agreement to results of Udhaya *et al.* and Agarwal *et al.*^{2,5}

Mean HD according to the present study is 3.04 mm on the right side and 2.86 mm on the left side, which was in contrary to studies by Udhaya *et al.* (2.28 mm on right and 2.95 mm on left). The mean HD is nearer to values found in a study by Dipti A Nimje *et al.* (3.11 on the right side), whereas a contrary was found on the left side (3.18 mm).^{2,6}



Figure 1: Horizontal diameter



Figure 3: Distance from symphysis menti



Figure 2: Vertical diameter



Figure 4: Distance from inferior border of mandible

Table 1: The mean and standard deviation of different parameters

Parameters	Right	Left	P value
HD	3.04±1.05	2.86±0.94	0.45
VD	2.31±0.47	2.19±0.40	0.24
DSM	25.9±1.71	26.7±1.87	0.06
DIB	13.2±1.56	12.9±1.61	0.44

HD: Horizontal diameter, VD, Vertical diameter, DSM: Distance from symphysis menti, DIB: Distance from inferior border

Table 2: The direction of opening on two sides

Shape	Right (%)	Left (%)
Oval	25 (71.42)	24 (68.57)
Round	10 (28.57)	11 (31.42)

Table 3: Mean values of different parameters in different populations (in mm)

Author	HD		VD		DIB		DSM	
	Right	Left	Right	Left	Right	Left	Right	Left
Dipti A Nimje (11)	3.11	3.18	2.53	2.56	12.39	12.27	25.81	25.81
Olivera Junior (6)	3.32	3.25	2.38	2.39	12.95	12.96	-	-
Agarwal (9)	3.33	3.25	2.15	2.13	12.16	12.11	25.55	25.05
Udhaya (8)	2.28	2.95	2.86	2.52	12.77	12.65	25.29	25.79
Rahul Rai (13)	2.63	2.61	2.33	2.29	12.43	12.17	22.41	22.23
H S Shaik (12)	12.40	12.3.19	2.50	2.50	12.40	12.21	26.62	26.40

HD: Horizontal diameter, VD, Vertical diameter, DSM: Distance from symphysis menti, DIB: Distance from inferior border

Mean VD in the present study is 2.31 mm on the right side and 2.19 on the left side. These values are near to the study by Olivera Junior (2.38 mm and 2.39 mm on right and left, respectively).³

DSM is found to be 25.90 mm on the right side and 26.7 mm on the left side. Studies by Hussain Saheb

Shaik *et al.* showed DSM is found to be at a distance of 26.62 mm on right and 26.40 mm on the left side of the mandible. Contrary to this is seen in studies by Rahul Rai, who observed that it is only 22.41 mm on the right side and 22.23 on the left side.^{6,7} DIB of mandible as observed in the present study is 13.19 mm on right and 12.90 mm on the left. These are nearer to values found by Olivera Junior *et al.* (12.95 mm on right and 12.96 mm on left).³ Comparison of the data of the present study with other authors is presented in Table 3.

CONCLUSION

The presence of mental neurovascular bundle in the MF makes it necessary to isolate the foramen in the above-mentioned clinical procedures. Hence, establishing a safety zone in this region becomes necessary. The various parameters as taken in the present study help the clinician to locate the foramen as there is no proper anatomical landmark for its isolation.

REFERENCES

1. Standring S. Gray's Anatomy. 39th ed. London: Elsevier Churchill Livingstone; 2005.
2. Udhaya K, Saraladevi KV, Sridhar J. The morphometric analysis of the mental foramen in adult dry human mandibles: A study on the South Indian population. J Clin Diagn Res 2013;7:1547-51.
3. Oliveira EM Jr, Araújo AL, Da Silva CM, Sousa-Rodrigues CF, Lima FJ. Morphological and morphometric study of the mental foramen on the m-cp-18 jiachenjiang point. Int J Morphol 2009;27:231-8.
4. Nimje DA, Wankhede HA, Hosmani PB. Morphometric study of the mental foramen in dry adult human mandibles. Int J Rec Trends Sci Technol 2014;12:47-9.
5. Agarwal DR, Gupta SB. Morphometric analysis of mental foramen in human mandibles of South Gujarat. People J Sci Res 2011;4:15-8.
6. Talwad R, Saheb SH. Morphometric and morphological study of human dry mandible. Int J Anat Res 2016;4:2037-40.
7. Rai R, Shrestha S, Jha S. Mental foramen: A morphological and morphometrical study. Int J Health Biomed Res 2014;2:144-50.

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