



Relevance of Position of Surgically Important Mental Foramen in Human Mandibles of Vindhya Region

P.G.Khanwalkar¹, Bhaskar B.Reddy²

¹Professor & and Head, ²Assistant Professor, Department of Anatomy, Shyam Shah Medical College, Rewa, Madhya Pradesh

Correspondence Author: Bhaskar B.Reddy, Assistant Professor, Department of Anatomy, Shyam Shah Medical College, Rewa, Madhya Pradesh

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Objective: To contribute the database of location and mapping of mental foramina of human mandibles in Vindhya region of Madhya Pradesh.

Design: Prospective Cross-sectional study

Material & methods: Study was carried out on 52 dried mandibles from Department of anatomy S.S.Medical College Rewa. Three important measurements including distance of mental foramen from(MF) symphysis- menti, base and alveolar border were measured similarly evaluation of MF for its shape was also done bilaterally

Results: Present study reports that mental foramen on an average found below PM-2 (second premolar) which probably different for natives of this region. Other parameters as MF-AB distance, MF-SM distance & MF-BM distances were found more or less similar as study of previous workers of Indian sub-continent.

Conclusions: Our study reveals that situation of MF is in line of PM-2 is different from previous studies from other regions of India and abroad.

Keywords: MF: mental foramen, PM-2: second premolar

Introduction

Mental foramen is bilaterally situated in human mandible they are surgically important for maxillofacial and dental implant surgeries . Anatomical variations, shape and exact location pertaining to mental foramina help performing

surgeon to block emerging nerves or ligating vessels precisely. Knowledge of precise location of these foramina reduce relative risks during surgical procedures of face.^{1&2}

Mental foramen has been shown to be located precisely at the same levels in most humans (13-15mm superior to inferior border of the mandible³. While some showed the most prevalent position to be between the premolars, others reported it to be in the line with long axis of second premolar.⁴

Mental foramen transmits mental nerves and vessels.⁵ It marks the termination of mandibular canal in the mandible through which the inferior alveolar nerve and vessels pass. At this point mandibular canal bifurcates and forms the mental incisive canals. The mental bundle passes through the mental foramen and supplies sensory innervations and blood supply to the soft tissues of the chin, lower lip and gingival on the ipsilateral side of the mandible⁶ . The shape, size, location and direction of the opening of mental foramen have many variations and these variations are largely influenced by individual, gender, age, race, accessing technique used and degree of edentulous alveolar bone atrophy.⁷

As limited database is available about mental foramina in different regions of India we undertook current study targeting Vindhya region of north eastern Madhya

Pradesh. Mental foramen situated in body of mandible transmitting nerve and vessels of same name, situated midway between base and alveolar border in premolar region.

The present study aimed to study situation of mental foramina in dried human mandible, variability of shape, size, and situation of these foramina in a known geographic region of Madhya Pradesh.

Material and Methods

Our study is carried out on dried human mandibles available in department of anatomy SSMC Rewa and also included mandibles from personel collections of students of same institute.

We studied 52 mandibles of unknown sex and took following measurements with the help of sliding vernier caliper to measure two digits from decimal.

Following measurements were taken:

1. Distance of MF from base of mandible.(MF-BM)
2. Distance of MF from symphysis -menti . (MF-SM)
3. Distance of MF from occlusive plate of alveolar margin of mandible. (MF-AB)

Observations

Table 1. Morphometric measurements of Mandible(n=52).

SN	Distance between m.m.	MEAN			SD
		Right m.m.	Left m.m.	Mean m.m.	
1.	MF-AB	11.68	12.14	11.91	±2.566
2.	MF-SM	26.12	28.98	27.55	± 2.022
3.	MF-BM	12.93	13.79	13.36	±0.608

1.MF mental foramen . 2. AB alveolar border 3. SM symphysis- mantai 4. BM base of mandible

Table 2. Morphometric measurements of mandible: shape of foramina and situation:

SN	Name of foramen	Shape of foramen		Situation	
		Right side	Left side	Right side	Left side
1.	MF	Oval 62% Rounded 38%	Oval 58% Rounded 42%	Below PM2 35 mandibles (67%)	Below PM2 17 mandibles (33%)

Table-3: Shape of the Mental Foramen (MF) (Comparison with Other Studies)

Shape	Present Study 2018, Vindhya region, India (n=52)	Siddiqui ⁹ 2011, Westem India (n=93)	Ilaypenma ¹⁰ 2009, Sri Lanka (n=51)	Fabian ¹¹ 2007, Tanzania (n=100)	Prabodha ¹² 2006, Sri Lanka (n=24)
Oval	31(60%)	65(70%)	30(59%)	54(54%)	16(66.67%)
Rounded	21(40%)	28(30%)	21(41%)	46(46%)	8(33.33%)



Fig 1: Distance of MF from Symphysis -Menti . (MF-SM)



Fig 2: Distance of MF from occlusive plate of alveolar margin of mandible. (MF-AB)



Fig 3: Distance of MF from base of mandible.(MF-BM).

Discussion

The precise identification of position of mental foramen is important in both diagnostic and clinical procedures. The accurate knowledge of the various morphologic and morphometric parameters of MF can be of immense help in proper localization of the important maxilla-facial neurological structures in and around the mental foramen.⁸

In the present study, the most commonly encountered shape of the MF was oval (60%) followed by a rounded shape in 40% cases. Referring to table no 1, this predominance of the oval shape has also been reported by other workers, though the values vary in different populations.^{9,10,11,12}

The most commonly seen position of the MF in relation to the lower teeth/interdental space was seen below the 2nd premolar in 67% cases on the right and 33% on the left.

Yesilyurt et al¹³ in their study have quoted that the most common positions for the MF were (i) below the second premolar tooth in Chinese, Kenyan Africans, Nigerians and Mongoloid populations similar to our study.

Conclusion

Present study reports that Mental foramen on an average found below PM-2 (second premolar) which probably different for natives of this region. Other parameters as

MF-AB distance, MF-SM distance & MF-BM distances are more or less similar as study of previous workers of Indian sub-continent. As found in our study the situation of MF is inline and below premolar -2 seems to be very common in this region. Knowledge of exact position and various distances of MF from known landmarks may help surgeons of this region to locate precisely MF for nerve block during dental implants and facial surgery.

Declarations

Funding: None

Conflict of interest: None

Ethical approval: Study involved only dry human skeletal material, so ethical approval is not required

References

1. Jose Inacio Saadi Salomao, Jose Antonio Saadi Salomao, New anatomic intraoral reference for the anaesthetic blocking of the anterior and middle maxillary alveolar nerves (Infraorbital Block) Braz Dent J (1990) 1(1): 31-36 ISSN 0103- 6440.
2. Zide BM., Swift R. How to block and tackle the face. Plast Reconstr Surg. 1998; 101:840 – 51.
3. Haghanifar S, Rokouei M.; Radiographic evaluation of the mental foramen in a selected Iranian population; Indian J Dent Res; 2009, 20(2):150-152.
4. Ukoha U.U, Kosisochukwu E.U, Ofoego U.C, Ejimofor O.C, Nzeako H.C and Edokwe C.G; Position, shape and direction of the mental foramen in mandibles in South-Eastern Nigeria; IJBR; 2013, 4 (9).
5. Moore K.L., Dalley A.F., Agur A.M.R.; Clinically Oriented Anatomy; Wolters Kluwer/Lippincott Williams & Wilkins, 6th Edition.2010.
6. Phillips J.L., Weller R.N., Kulild J.C.; The mental foramen: Size, orientation and positional relationship to the mandibular second premolar; J Endod; 1990, 16(5):221-3.

7. Juodzbalys G, Wang H.L., Sabalys G.; Anatomy of Mandibular vital structures. Part II: Mandibular Incisive Canal, Mental Foramen and associated Neurovascular Bundles in Relation with Dental Implantology; Journal of Oral and Maxillofacial Research; 2010, 1(1): e3.
8. Agarwal D.R., Gupta S.B.; Morphometric Analysis of Mental Foramen in Human Mandibles of South Gujarat; People's Journal of Scientific Research; 2011, 4(1):15-18.
9. Siddiqui A.U., Daimi S.R., Mishra P.P., Doshi S.S., Date J.Y., Khurana G; Morphological and morphometric analysis of mental foramen utilizing various assessment parameters in dry human mandibles; Int J Stud Res; 2011,1(1):19-22.
10. Ilayperma I, Nanayakkara G, Palahepitiya N. Morphometric analysis of mental foramen in adult Srilankan mandibles. Int J Morphol 2009; 27(4):1019-24.
11. Fabian FM. Position, shape and direction of opening of mental foramen in dry mandibles of Tanzanian adult black males. Ital J Anat Embryol 2007;112(3):169-77.
12. Prabodha LBL, Nanayakkara BG. The position, dimensions and morphological variations of mental foramen in mandibles. Galle Med J 2006;11(1):13-5.
13. Yesilyurt H, Aydinlioglu A, Kavakli A, Ekinci N, Eroglu C, Hacialiogullari M, et al. Local differences in the position of the mental foramen. Folia Morphol 2008;67(1):32-35.