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# Original Research

## Position and symmetry of mental foramen

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***ABSTRACT:***

**Background:** To study the position and symmetry of mental foramen. **Materials & methods:** A total of 20 subjects were enrolled. The age of subjects was 20 to 40 years. The panoramic radiographs were taken to study with MF visible on both sides of the mandible, all mandibular premolar teeth present, premolar region clearly visible on the panoramic radiographs. Scoring system was taken under consideration. Data was collected and result was analysed using SPSS software. **Results:** A total of 20 panoramic radiographs were taken under consideration. MF was located most frequently between the first and second premolar, with the second most frequent position being below the second premolar for apex scores. **Conclusion:** The most common position of MF is between 1st and 2nd premolar teeth.

**Keywords:** mental foramen, position, anatomy, radiographs.

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### INTRODUCTION

The inferior alveolar nerve, a branch of the trigeminal nerve, divides into its terminal mental and incisive branches at the mental foramen (MF) with the incisive nerve continuing an intraosseous course through the anterior mandible. The position of the MF may be an important consideration during the administration of local anaesthetic solution for anaesthesia of the anterior mandibular teeth and associated bone and soft tissues and for surgical procedures in this region. The position of the MF demonstrates anatomical variations, although typically it is reported to be either between the apices of the first and second premolars or below the apex of the second premolar.[1] It can, however, be found as far anterior as the canine [2] and as far posterior as the first molar. [3]

A strategically eminent landmark, the mental foramen (MF) shares its significance in various fields of dentistry. [4]Accurate identification of the mental foramen is important for both diagnostic and clinical procedures. Repeated failures which are witnessed during mental nerve blocks indicate its variability of location in a given population.[5] Its radiographic misdiagnosis as a radiolucent lesion in the apical area of the mandibular premolars can lead to iatrogenic injuries. Treatment concepts for dental implant patients identify mental foramen and its anterior loop as a critical surgical landmark and essential reference point during treatment planning. It has also been acknowledged through various studies, that surgical trauma caused to the mental nerve bundle as a result of inappropriate prior assessment, would result in altered sensation from 8.5% to 24% during periods of upto 3-16 months post-operatively following implant surgeries. [6,7]Panoramic radiography is a curved plane topographic technique which allows broad coverage of oral structures with low radiation exposures (about 10% of full-mouth radiographs). However, major drawbacks include low image resolution, high distortion, and presence of phantom images. Despite developmental advancements in radiological examinations such as computed tomography, conventional panoramic radiographs are more commonly used, since advances in imaging techniques not only expose the patient to higher doses of radiation, but also are an expensive affair. [8,9] Hence, this study was conducted to study the position and symmetry of mental foramen.

### MATERIALS & METHODS

A total of 20 subjects were enrolled. The age of subjects was 20 to 40 years. The panoramic

radiographs were taken to study with MF visible on both sides of the mandible, all mandibular premolar teeth present, premolar region clearly visible on the panoramic radiographs. Scoring system was taken under consideration. Data was collected and result was analysed using SPSS software.

**Table 1: scoring system used to assess position of mental foramen mental foramen position score**

| Apex score | |
|---|---|
| 1 | Mesial to first premolar apex |
| 2 | Directly below the first premolar apex |
| 3 | distal to the first premolar apex and mesial to the second premolar apex |
| 4 | Directly below the second premolar apex |
| 5 | distal to the second premolar apex |

## RESULTS

A total of 20 panoramic radiographs were taken under consideration. MF was located most frequently between the first and second premolar, with the second most frequent position being below the second premolar for apex scores.

**Table 2: position of mental foramen in relation to premolar apex**

| Position | Right | Left |
|---|---|---|
| Anterior to first premolar apex (Score 1) | 0 | 0 |
| Below the first premolar apex (score 2) | 2 | 1 |
| Between first and second premolar apices (score 3) | 10 | 12 |
| Below the second premolar apex (score 4) | 7 | 6 |
| Posterior to the second premolar apex (score 5) | 1 | 1 |

**Table 3: distribution of symmetry of mental foramen in vertical plane in relation to apices of teeth**

| Location | Number | Percentage |
|---|---|---|
| At apex of 1st premolar | 1 | 5 |
| In between the apex of 1st and 2nd premolar | 15 | 75 |
| At apex of 2nd premolar | 3 | 15 |
| Inferior to the apex of 2nd premolar | 1 | 5 |
| Total | 20 | 100 |

Symmetry of mental foramen in relation to apices of teeth in vertical plane was more at the position of in between the apex of 1st and 2nd premolar comprising of 75% whereas inferior to the apex of 2nd premolar was 5%. In majority of the subjects, the MF was symmterical.

## DISCUSSION

Studies determining the position of the MF in dental radiographs frequently include measurements of the position of the MF in relation to the mandibular midline and other bony landmarks; however, magnification and incorrect patient positioning frequently make absolute measurements inaccurate. [10]

As the apices of teeth cannot be readily visualized on clinical examination, the relationship of the MF to the apices of teeth may also be of limited clinical use. It would be useful to relate the position of the foramen to clinically visible structures, such as the crowns of teeth in dentate individuals. Hence, this study was conducted to study the position and symmetry of mental foramen.

In this study, a total of 20 panoramic radiographs were taken under consideration. MF was located most frequently between the first and second premolar, with the second most frequent position being below the second premolar for apex scores.A study by Parnami P et al, six hundred digital panoramic radiographs were selected and studied regarding the location and symmetry of mental foramen. They were also compared with the other studies in the literature. Certain modifications were carried out in Fishal's criteria for vertical position assessment. The commonest position of the mental foramen in horizontal plane was in line with the longitudinal axis of the second premolar (61.0%) while in vertical plane it was found to be located inferior to the apex of second premolar (72.2%). Mental foramen exists in different locations and possesses many variations. They suggests that the clinicians should carefully identify these anatomical landmarks, by analyzing all influencing factors, prior to their diagnostic or the other dental, surgical and implant operation. [11]

In the present study, symmetry of mental foramen in relation to apices of teeth in vertical plane was more at the position of in between the apex of 1st and 2nd premolar comprising of 75% whereas inferior to the apex of 2nd premolar was 5%. In majority of the subjects, the MF was symmterical. Another study by Bello SA et al, study analysed 320 orthopantomograms of subjects from two centres. Furthermore, the right and left mental foramina were compared to ascertain both shape and positional symmetry. Most of the foramina analysed were horizontally positioned between the mandibular first

and second premolars (65.9%) and vertically positioned greater than 2 mm below the apex of the second mandibular premolars. The average vertical dimension and horizontal dimension of the foramen is 2.87 (SD 1) mm and 3.56 (SD 1.23) mm respectively with 55.2% of the foramen analysed being ovoid in shape. Asymmetrical mental foramina were seen in 164 subjects (51.3%) while 156 subjects had symmetrical mental foramina (48.7%). The mental foramen is most commonly located between the mandibular premolars, greater than 2 mm below the apex of the second mandibular premolars. They are usually ovoid in shape with an almost equal distribution of asymmetry and symmetry. [12]In jaws in which the mental foramen is not exposed on the top of the alveolar crest, the anatomical foramen is situated higher than the radiographically detectable foramen. This is actually an image of a part of the rising terminal part of the mental canal. The differences in the position of the anatomical foramina between the dentulous and the edentulous are thus in fact greater than the radiographic values reported here, because the mental canal was not present in the majority of the edentulous due to alveolar atrophy. [13]Other studies have related the position of the MF to the long axis of premolar teeth in other ethnic groups. The foramen has been reported to be between the first and second premolars in Jordanian [14] and Asian Indian populations.[15] By contrast, the MF was located in line with the second premolar in both Saudi population [2] and Malay population.[16]

## CONCLUSION

The most common position of MF is between 1st and 2nd premolar teeth.

## REFERENCES


1. Greenstein G, Tarnow D. The mental foramen and nerve: clinical and anatomical factors related to dental implant placement: a literature review. J Periodontol 2006; 77: 1933–43.
2. alJasser NM, Nwoku AL. Radiographic study of the mental foramen in a selected Saudi population. DentomaxillofacRadiol 1998; 27: 341–3.
3. Phillips JL, Weller RN, Kulild JC. The mental foramen: 3. Size and position on panoramic radiographs. J Endod 1992; 18: 383–6.
4. Shaik HS, ShepurMuralidhar P, Desai SD, Thomas ST, Maavishettar GF, Haseena S. Morphological and morphometric study of mental foramen south indian mandibles. Indian Journal of Medicine and Healthcare. 2012;1(3):64–66.
5. Siddiqui AU, Daimi SR, Mishra PP, Doshi SS, Date JY, Khurana G. Morphological and Morphometric analysis of mental foramen utilizing various assessment parameters in dry mandibles. Int J Stud Res. 2011;1(1):19–22.
6. Massey ND, Galil KA, Wilson TD. Determining position of the inferior alveolar nerve via anatomical dissection and micro-computed tomography in preparation for dental implants. J Can Dent Assoc. 2013;79:d39.
7. Greenstein G, Tarnow D. The mental foramen and nerve: clinical and anatomical factors related to dental implant placement: a literature review. J Periodontol. 2006 Dec;77(12):1933–43
8. Misch CE. In: St. Louis: the CV Mosby Company Misch CE Implant Dentistry. 3rd ed. 2008. Rationale for Implants; p. 56. Part 1: Chapter 3
9. White SC, Heslop EW, Hollender LG, Mosier KM, Ruprecht A, Shrout MK. Parameters of radiologic care: An official report of the American Academy of Oral and Maxillofacial Ra diology. Oral Surg Oral Med Oral Pathol Oral RadiolEndod. 2001 May;91(5):498–511
10. Laster WS, Ludlow JB, Bailey LJ, Hershey HG. Accuracy of measurements of mandibular anatomy and prediction of asymmetry in panoramic radiographic images. DentomaxillofacRadiol 2005; 34: 343–9
11. Parnami P, Gupta D, Arora V, Bhalla S, Kumar A, Malik R. Assessment of the Horizontal and Vertical Position of Mental Foramen in Indian Population in Terms of Age and Sex in Dentate Subjects by Panoramic Radiographs: A Retrospective Study with Review of Literature. Open Dent J. 2015 Jul 31;9:297-302.
12. Bello SA, Adeoye JA, Ighile N, Ikimi NU. Mental Foramen Size, Position and Symmetry in a Multi-Ethnic, Urban Black Population: Radiographic Evidence. J Oral Maxillofac Res. 2018 Dec 30;9(4):e2
13. Soikkonen K., Wolf J., Ainamo A., Xie Q. Changes in the position of the mental foramen as a result of alveolar atrophy. J. Oral Rehabil. 1995;22(11):831–833.
14. Al-Khateeb T, Al-HadiHamasha A, Ababneh KT. Position of the mental foramen in a northern regional Jordanian population. SurgRadiolAnat 2007; 29: 231–7
15. Rupesh S, Winnier JJ, John SA, Joy T, Rao AP, Reddy V. Radiographic study of the location of mental foramen in a randomly selected Asian Indian population on digital panoramic radiographs. J Med Sci 2011; 11: 90–5.
16. Ngeow WC, Yuzawati Y. The location of the mental foramen in a selected Malay population. J Oral Sci 2003; 45: 171–5.