

Original Research Article

Morphology and morphometry of mental foramen in dry human mandibles

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Received: 19 January 2017

Accepted: 03 March 2017

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ABSTRACT

Background: Mental foramen (MF) is an important landmark to facilitate surgical, local anaesthetic and other invasive procedures. The present study was aimed to provide anatomical information on the position, morphological variations and incidence of mental foramen and accessory mental foramen.

Methods: This study was conducted on 41 dry adult human mandibles in the department of anatomy, Government Medical College Srinagar, Jammu and Kashmir. Parameters like incidence, position, shape and presence of accessory mental foramen were studied.

Results: Mental foramen was present bilaterally in all 41 mandibles. Accessory mental foramen (AMF) was present in 2 cases (4.87%). The most frequent position of foramen in relation to the teeth was in line with the longitudinal axis of 2nd premolar on both right (63.42%) and left (60.98%) side. Most common shape was round shape.

Conclusions: Mental foramen variation often remains unnoticed and undiagnosed. Variations do exist in the position, shape, and size of mental foramen in different population groups. Present study provide the necessary data of mental foramen location and morphometry which may be useful for the surgeons, anaesthetists, neurosurgeons and dentists to carry out nerve block and surgical procedures.

Keywords: Accessory mental foramen, Mental foramen, Morphometry

INTRODUCTION

The mental foramen is an important anatomical landmark to facilitate surgical, local anaesthetic, and other invasive procedures. It marks the termination of mandibular canal in the mandible and is situated on the anterolateral aspect of the body of mandible through which the inferior alveolar nerve and vessels pass. Variations of the mental foramen are often seen ranging from difference in shape and positions to presence of accessory foramen or in some cases even complete absence.¹⁻³ The orientation and position of the mental foramen is important in both diagnostic and clinical procedures of the mandible.

Mental nerve bundle emerging from the mental foramen may get injured during surgical procedures with resulting paraesthesia or anesthesia along its sensory distribution (Phillips et al, 1990). Patient may complaint that there is transient or permanent loss of sensation of the lip, chin, oral mucosa that is often associated with a limited xerostomia (Gary and Dennis, 2006). This complication can occur if important vital structures such as mental foramen (MF) and anterior mental loop are not properly identified and protected.⁴

Keeping in view the importance of anatomical variations in mental foramen. The aim of the study was to elucidate

the morphological and morphometric features of mental foramen with reference to surrounding landmarks.

METHODS

41 dry adult human mandible of unknown sex obtained from the Government Medical College Srinagar, Jammu and Kashmir, India formed the material for study. The position of the mental foramen from various landmarks were recorded on both the sides. The measurements were taken with the help of the Vernier caliper. The morphological study included location, shape and number of mental foramina while morphometrical study included distance from symphysis menti, inferior border of mandible and alveolar ridge. The data was collected, tabulated and statistically analyzed. Continuous variables were summarized as mean and standard deviation. Categorized variables were summarized as frequency and percentages.

RESULTS

Mental foramen was present bilaterally in all 41 mandibles. Accessory mental foramen (AMF) was present in 2 cases (4.87%), on right side in both cases shown by an arrow in Figure 1.

The position of mental foramen in relation to mandibular teeth on two sides are shown in Table 1. The most frequent position of foramen in relation to the teeth was in line with the longitudinal axis of 2nd premolar on both right (63.42%) and left (60.98%) side. The second common position was in line between 1st and 2nd premolar (right 17.07%; left 21.95%); closely followed by position in the line between 2nd premolar and 1st molar teeth (right 19.51 %; left 17.07%). From Table 2 it can be read that the most common shape was round shape (58.54%) on both sides.



Figure 1: Image showing accessory mental foramen.

Morphometric features of 41 dried human mandibles revealed mean distance from mental symphysis on right side was 24.46±2.33 and on left side 24.19±2.60 while the mean distance from alveolar ridge and lower border

of mandible was nearly equal that can be read from Table 3.

Table 1: Location of mental foramen in mandible.

Side	Between I and II PMT	Longitudinal Axis Of II PMT	Between II PMT and I MT	Total (%)
Right	7 (17.07%)	26 (63.42%)	8 (19.51%)	41 (100)
Left	9 (21.95%)	25 (60.98%)	7 (17.07%)	41 (100)

Table 2: Shape of the mental foramen in percentage.

Side	Round	Oval	Total
Right	24 (58.54%)	17 (41.46%)	41 (100%)
Left	24 (58.54%)	17 (41.46%)	41 (100%)

Table 3: Morphometrical observations.

Distance from	Right (mean± SD)	Left (mean±SD)
Mental symphysis	24.46±2.33	24.19±2.60
Alveolar ridge	11.02±2.77	11.07±2.90
Inferior edge	11.12±1.81	11.07±1.72

DISCUSSION

The present study reveals valuable insights on the information related to the morphology of mental foramen in Kashmir, Jammu and Kashmir, India. The most common location of the mental foramen in our study was in a longitudinal axis of second premolar. It matches with the result of previous studies in other Asian countries like Sri Lanka and Thailand.^{5,6} Similar results were observed by other authors, where the mental foramen was found mostly in the longitudinal axis of the second premolar.⁷⁻¹⁰ While other studies showed that the most frequent location of the mental foramen was between 1st and 2nd premolars.¹¹⁻¹³ In present study accessory mental foramen was present in 4.87% close to Gershenson et al who examined 525 dry mandibles and reported that 4.3% mandibles had a double mental foramen.¹⁴ Serman reported the incidence of AMF to be 2.7% while Singh R Srivastav observed the presence of accessory holes in 13%.^{15,16}

Gupta S et al, Sekerci A et al and Singh R et al reported that the round shape of mental foramen is the most frequent one, which is consistent with the present study. While studies by Budhiraja V et al, Agarwal D et al and other authors found oval shape in most cases.^{9,10,16-21}

CONCLUSION

Mental foramen variation often remains unnoticed and undiagnosed. Variations do exist in the position, shape, and size of mental foramen in different population

groups. Present study provides the necessary data of mental foramen location and morphometry which may be useful for the surgeons, anaesthetists, neurosurgeons and dentists to carry out nerve block and surgical procedures.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Bala SS, Shahdad S, Bashir S. Morphology and morphometry of mental foramen in dry human mandibles. *Int J Res Med Sci* 2017;5:1461-3.