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Morphology and Morphometry of Mental Foramen in the Region of Maharashtra

KEYWORDS: Mental foramen, Symphysis menti, Mental nerve

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ABSTRACT *Morphological and Morphometric study of mental foramen helps to localize the mental nerve which is a branch of the inferior alveolar nerve. This study is of great clinical significance during anesthesia, dental procedure and acupuncture. Fifty adult dry mandibles were included in this study irrespective of sex. The morphological study included the location, shape and number of the mental foramen. Morphometric study included distance from symphysis menti, inferior border of mandible and alveolar ridge till the mental foramen. In this study, the most frequent location of the mental foramen was found in the line of the longitudinal axis of the II premolar tooth although, the location varies from I premolar tooth to I molar tooth. Forty eight possessed single mental foramen on each side whereas two mandibles had accessory mental foramen only on right side. The shape of the mental foramen was found oval in 72 % and round in 28%. In 26% of mandibles, it was not same on the both sides.*

INTRODUCTION:

The mental foramen is a small foramen located on the anterio-lateral aspect of the body of the mandible. It is usually one in each side of the mandible. The shape of the mental foramen is oval or rounded. The inferior alveolar nerve and vessels pass through the mental foramen to supply the buccal gingival, lower lip, chin and skin of the lower face.[1] The mental nerve is primarily a sensory nerve which innervate the lower canine and premolars. Therefore this area plays an important role in procedures such as administration of local anesthesia and surgical intervention. [1]

The absence and variation of accessory mental foramina have been reported previously and can range from 0.03% to 0.06% .[2,3] Gershenson et al. in 1986 examined 525 dry mandibles focusing on variation, shape and location of the mental foramen related to the teeth, reported that 4.3% mandibles had double mental foramina and 0.7% mandibles had triple mental foramina. They found one mandible that had four mental foramina on one side (0.1%).[4] Serman in 1989 examined 408 dry human mandibles and found one extra foramen on one side in seven mandibles constituting 1.7% and bilateral double mental foramina where found in two mandibles. They had documented eleven double mental foramina on 408 mandibular specimen (2.7%).[5] In 1998 Sawyer et al reported 5.9% accessory mental foramen in four ethnic groups and the maximum number found in any population was two.[6] Katakami et el examined 150 patients retrospectively with limited cone beam computed tomography and depicted 16 double foramina (10.6%) and triple mental foramina on one side (0.6%).[7] Naitoh et al studied 157 patients using cone beam computed tomography and found eleven patients had double foramina on one side (7%) and two mandibles (1.2%) that had triple mental foramina on the contra lateral side.[8]

The usual location of mental foramen is located in the longitudinal axis of II PMT (Premolar Tooth) but the location may vary from I PMT to I MT (Molar Tooth).[9] Sometimes, an anterior loop of the mental nerve may be present medial to the mental foramen and may cause mental nerve injury during dental implants.[10] Guidelines to verify the position of the mental foramen and validating the presence of an anterior loop of the mental nerve while establishing a zone of safety (in millimeters) for implant placement can avoid such nerve injury. Furthermore, the radiographic assessments result in a high percentage of false negative findings. These false findings can cause sensory dysfunction due to inferior alveolar nerve damage in the foraminal area. The foramen may occasionally misdiagnose with a radiolucent lesion in the apical area of the mandibular premolar teeth. Additionally, local anesthesia of the terminal incisive branches of the inferior alveolar and mental nerves can be obtained effectively if the mental foramen is correctly identified. Therefore, computerized tomography (CT) are more accurate for detecting the mental foramen than conventional radiographs.[11] Therefore, the current study involves in analyzing the morphology and morphometry of the mental foramen in a dry adult mandibles.

MATERIALS AND METHODS:

A total of 50 adult dry mandibles were collected for the study irrespective of sex from department of anatomy of various medical colleges of Navi Mumbai. The morphological measurement included location, shape and number were studied visually in detail. Morphometrical study included distance from symphysis menti, inferior border of mandible and alveolar ridge were measured using vernier caliper. All the measurements were noted, tabulated and statistically analyzed.

RESULTS:

Morphological changes:

Table: 1

Location of mental foramen in mandible			
Side	Between I & II PMT	Longitudinal Axis Of II PMT	Between II PMT & I MT
Right	24% (12)	62% (31)	14% (7)
Left	26% (13)	48% (24)	26% (13)

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Table: 2

Shape of the mental foramen in percentage		
Side	Round	Oval
Right	32%	68%
Left	24%	76%

Morphometrical observations:
Table: 3

Distance from	Mean	Mode	Range
Mental Symphysis	2.6cm	2.6cm	(2.1-2.9)cm
Alveolar Ridge	1.3cm	1.4cm	(1.1-1.6)cm
Inferior Edge	1.27cm	1.3cm	(1.0-1.5)cm

DISCUSSION:
The present study provides a new data for the location of the mental foramen in an adult dry mandible. The most common location of the mental foramen was in a longitudinal axis of II PMT. It matches with the result of previous studies in other Asian countries like Sri Lanka and Thailand.[12,13] The interesting fact is that the position of mental foramen during early prenatal life is in the alveolar bone between the primary canine and the first molar tooth.[14] Deviation from the normal position is due to the lag in prenatal development. The mean distance between mental foramen and symphysis menti was also shown to be varied among population such as Thai.[13] The result in this study shows that the above distance was 2.6 cm. The shape of the mental foramen was found oval and round which match with the result of Sri Lanka and Thailand.[12,13]

CONCLUSION:
The recent trend of replacement of missing teeth by dental implants and the increasing frequency of orthognathic surgeries have highlighted the clinical significance of the mental foramen. Mental foramen variation often remains unnoticed and undiagnosed. In order to obtain effective nerve block and to avoid post procedural neurovascular complications in the mental region, particular attention should be paid to the morphology of the mental foramen. A prior CT scan can elucidate jaw structures and prevent patient morbidity. Therefore, a detailed knowledge of the mental foramen and it's variation in different population is essential for dentists, orthopedicians and anatomists. A future prospect of interest lies in their possible contribution to the maxillofacial anthropologic characteristic identification for different population and races.

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