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Morphometric Analysis of Mental Foramen in Human Mandibles of Gujarat Region

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ABSTRACT

Mental Foramen is found on the anterolateral aspect of the mandible and transmits mental nerves and vessels. Knowledge of the localization and number of mental foramina can be useful in certain surgical procedures such as dental implant, mental nerve block, genioplasty and correction of jaw abnormality etc. The present study was done in 50 dried human mandibles of unknown sex obtained from the Department of Anatomy, B. J. Medical College, Ahmedabad. The parameters including dimension, shape, number, location and direction of mental foramen were studied. In most of cases the mental foramen is oval in shape, single and directed posterosuprior. Common position of mental foramen was in between the first and second premolars and followed by location below 2nd premolar tooth.

INTRODUCTION

The mental foramen, from which the mental neurovascular bundle emerges, lies below either the interval between the premolar teeth, or the second premolar tooth, midway between the upper and lower borders of the body **(**Standring, 2008). Its accurate identification determines the effectiveness of nerve blocks and prevention of postoperative neurovascular complications (Hasan, 2012). Aims of present study were to elucidate the morphology and morphometry of the mental foramen and its commonly occurring variations.

MATERIAL AND METHOD

The present study was based on examination of fifty dry mandibles available in anatomy department of B. J. Medical College. Age and sex of the mandibles were not known. The direction, shape and position in relation to tooth were noted by naked eye examination. To determine the position of mental foramen in relation to alveolar crest, a vertical line AB from the middle of the alveolar crest of 2nd premolar tooth to the inferior border of the mandible and distance from the middle of the alveolar crest of 2nd premolar tooth to the centre of the mental foramen (AD) also recorded with digital Vernier caliper as shown in figure 1. Dimensions (Vertical diameter, Horizontal diameter) of mental foramen recorded with digital Vernier caliper.

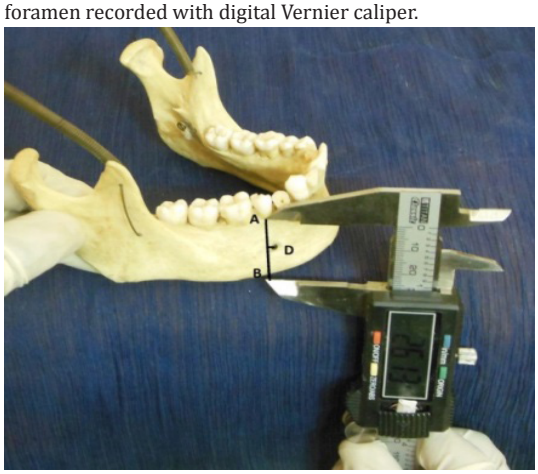

Figure 1. Showing method to determine position of mental foramen.

OBSERVATION

Shape – Oval in all mandibles.

Direction- Direction of mental foramina were poster-superior, superior and lateral in 96%,3% and 1% respectively**.**

Number- Number of mental foramina on each side was single in 96%, whereas double in 3% and three in 1% cases.

Position in relation to teeth – as in Table I

Table I: Frequency of the location of mental foramen in relation to mandibular teeth between the two sides.

Location	Right side	Left side
Between 1st & 2nd premolar	57.45%	54.17%
Below 2nd premolar	36.17%	39.58%
Below 1st premolar	2.12%	2.08%
Anterior to 1st premolar	2.12%	2.08%
Between 1st & 2nd premolar	2.12%	2.08%

Not measurable: Right -3, Left-2

Position to alveolar crest: Distance from the alveolar crest to the inferior border of the mandible (AB) at the level of 2nd premolar tooth was 26.15mm and 26.53mm on right and left side respectively. The average distance from alveolar crest of mandible to the centre of foramina (AD) was 12.73mm on right and 12.67mm on left side.

Dimensions: Mean horizontal diameter was 3.62mm on right side and 3.52mm on left side, whereas mean vertical diameter was 2.92mm on right side and 2.87mm on left side**.**

DISCUSSION

Mental Foramen represents the termination of the mental canal. The inferior alveolar nerves and vessels, after traversing the mandibular canal, exit through the Mental Foramen as the mental nerves and vessels. These form important innervations for the lower jaw, cheek, teeth and lip. (Bavitz, Harn, Hansen, Lang 1993) There are discrepancies in studies regarding the shape, size, position and number of Mental Foramen in human mandibles (Sawyer, Kiely, Pyle, 1998). These discrepancies result from naturally occurring differences in facial structure, jaw skeleton size and feeding habit induced bone remodelling in mandibles of different human races. (Hasan, 2012) The shape of mental foramen is predominantly oval and less commonly circular. Different shapes have been observed in different studies. The opening of the mental canal was posterosuperiorly in majority of the subjects (96%). This was in agreement with previous studies (Deepa Rani Agarwal, Sandeep B. Gupta, 2011),

(Bhandari, Nimmagadda, Mukherji, 2013).Though existence of a single mental foramen is the most common presentation, variations like supernumerary (accessory mental foramen) or absent foramen are also encountered. In fact, presence of accessory foramina (double>triple >quadruple) is a much more common phenomenon than absence. This phenomenon occurs due to splitting of the mental nerve into several fasciculi before the development of mental foramen during the 12th week of intrauterine life (Hasan, 2012). The greatest horizontal diameter of the (FIO) found was of 3.32 (± 0.91) mm to the right side, and of 3.25 (± 0.86) mm to the left side, while the greatest vertical diameter found was of 2.38 (± 0.63) mm on the right side and of 2.39 (± 0.58) mm on the left side (Oliveira Junior, Araújo, Da Silva, Sousa-Rodrigues, & Lima, 2009). In present study horizontal diameter were 3.62mm, 3.52mm on right and left side respectively and vertical diameter were 2.92mm, 2.87mm on right and left side respectively. In present study the most common location was between the two premolars, below the second premolar. Vertically Mental foramen is placed slightly above the midpoint of the line joining the mandibular lower border and alveolar crest. The location of mental foramen also changes with age. At birth mental foramen lies close to the lower border. In adults after eruption of permanent teeth the mental foramina lies midway between the upper and lower borders. In old age, after loss of teeth, absorption of alveolar margin brings the mental foramen nearer the upper border (Datta).

CONCLUSIONS

The mental foramen is oval in shape, mostly single and directed posterolaterally. Common position of mental foramen in relation to teeth are in between the premolar teeth and below 2nd premolar tooth. Position of mental foramen in relation to alveolar crest and lower border of mandible varies with age. Horizontal diameter of mental foramen was 1.72-7 (3.62)mm. vertical diameter of mental foramen was 1.34-5.17(2.92)mm. Knowledge of the localization and number of mental foramina can be useful in certain surgical procedures such as dental implant, mental nerve block, genioplasty and correction of jaw abnormality etc.

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