

Anthropometry Study on Mental Foramen in Human Mandible

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Abstract: Mental foramen is an oval and circular opening on the anterior surface of mandible and it's transmit mental nerve and vessels. Present study was done on fifty dried human mandible. The aim of study is to provide data on anthropometry of mental foramen. Size and distances from the various landmarks were noted with the help of digital vernier calipers. Results found of shape of mental foramen was circular 73.5%. The position of the mental foramen below the apex of second premolar 52%. The average distances of the mental foramen from symphysis menti are 25.28mm on right side and 23.04mm left side. From posterior border of ramus are 65.47mm right side and 76.11mm left side. From alveolar crest are 14.86mm right side and 15.36mm left side. From base of mandible are 14.53mm right side and 14.01mm left side.

Keywords: Anthropometry, Second Premolar, Symphysis Menti

1. Introduction

The skull forms the cranial end of the axial skeleton. The only movable bone is the mandible or lower jaw bone. An articulated skull consists of two parts neurocranium and splanchnocranium. The neuro-cranium includes those bones which enclose the cranial cavity to contain the brain and its coverings meninges. The splanchnocranium including the mandible forms the facial skeleton. (A.K.Dutta) Mandible is the bone of the lower jaw, it has a horse shoe shaped body and it is the largest, strongest and lowest bone in the "splanchnocranium" the mandible can be divided into four functional components as the condyle, ramus, body and the alveolar process and ossification of the mandible is essential to understand the development of the mandible. Mental foramen is found on the anterolateral aspect of the mandible and transmits mental nerves and vessels. The knowledge of anatomical morphometry of mental foramen is essential in clinical dentistry when administering regional anesthesia and performing periapical surgery in the mental foramen is anesthetized during the dental procedures, suturing of soft tissue lacerations of mouth and biopsy. (Deepa rani aggarwal) The mental foramen is defined as the entire funnel like an opening in the lateral surface of the mandible at the terminus of the mental canal. This foramen is contained entirely within the buccal cortical plate of bone. The average size of the foramen is 4.6 mm horizontally and 3.4 mm vertically on the lateral surface of the mandible. The foramen is usually larger on the left side of the mandible. The mental foramen marks the termination of the mandibular canal in the mandible, through which the inferior alveolar nerve and vessels pass. At this point, the mandibular canal bifurcates and forms the mental and incisive canals. The mental foramen is difficult to locate. There are no absolute anatomical landmarks for reference and the foramen cannot be clinically visualized or palpated, As a result, the reported anatomical position of the mental foramen has been variable. Most studies and textbooks however, describe the location of the mental foramen as being below the apex of the second premolar or between the apices of the first and second premolar (Wei cheong ngeow).

2. Material and Method

In the present study 50 dried human mandibles from the Anatomy Department of Subharti Medical College. Were macroscopically analyzed & measured us in anthropometric instrument. 50 dried adult human mandibles with complete dentition and intact alveolar margin of unknown sex obtained from the Department of Anatomy, Subharti Medical College, and Meerut were used for this study. The shape, location of mental foramen, direction of opening of mental foramen was measured on both sides of mandibles by using digital vernier caliper. The shape of mental foramen right and left side was either oval or rounded.

- Location of mental foramen was identified by using following parameters.
- Distance from mental foramen to mental symphysis.
- Distance between the mental foramen to posterior border of ramus.
- Distance from mental foramen to alveolar crest.
- Distance from mental foramen to base of mental foramen.

3. Results

Table 1: Showing the position of mental foramen from various landmarks.

Landmarks	Mean distances on right side	Mean distances on left side
Symphysis menti	25.28 mm	23.04 mm
Posterior border of ramus of mandible	65.47 mm	76.11 mm
Alveolar crest	14.86 mm	15.36 mm
Base of mandible	14.53 mm	14.01 mm

Various parameter studied are as follows:

The mean distance between the mental foramen and symphysis menti for right side was 25.88mm±1.021 and for left side was 23.04mm±1.022.

The mean distance between mental foramen and posterior border of ramus of mandible for right side was 64.47mm±1.0 and for left side was 76.11mm±1.02.

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The mean distance between mental foramen and alveolar crest for right side was 14.86mm±1.01 and for left side was 15.36mm±1.08.

The mean distance between the mental foramen and base of mandible for right side was 14.5mm±1.03 and for left side was 14.01mm±1.01.

Shape of the mental foramen is circular in 73.55% and oval 26.66%, mental foramen having a long and short diameter were termed as oval foramina and the ones with equal diameter as circular foramina. Position of mental foramen was seen below the apex of second premolar tooth in 52% of mandible others are below the first and second premolar tooth.

4. Discussion

In present study mental foramen was seen below the apex of second premolar tooth in 52% of mandible. The position of mental foramen was observed to below the apex of second premolar tooth in 49% by Tebo and Telford (1950), 40% by Miler (1953), 58.98% by Wang et al (1986) and 52.9% by Santini and Land (1990). According to by Suresh Kanta Singh the mental foramen below the second premolar tooth in 68.75%. 50% (1992). 50% by P.S. Igbigbi and S. Labong in (2005), According to Mwaniki DL, Hassanali J. the mental foramen below the second premolar tooth in 56.1% (1992). According to Olasajiet (2004) mental foramen present below the first and second premolar tooth.

Table 2: Showing deferent study on position of mental foramen :

Name of Authors & Year of Study	Population	Right side				Left side			
		D1	D2	D3	D4	D1	D2	D3	D4
Suresh Kanta Sigh et al (1992)	North Indian Population	65.8	14.3	15	24.7	76.7	13.7	15.6	22.6
P.S.Labong et al (2005)	Adult Malawian Population	73.11	13.24	13.7	26.4	74.06	13.4	12.9	26.3
Yesilyurt et al (2008)	Kenyan African Mandible	48.58	NA	Na	19.18	48.27	NA	NS	19.37
Rajani Singh & A.K. Shrivastav et al (2010)	North Indian Population	71.3	17.3	17	29.3	84.7	13.3	18.6	30.6
Present study (2013)	North Indian Population	65.47	14.53	14.86	25.28	76.11	14.01	15.36	23.04

- [D1= Distance between the mental foramen to posterior border of ramus]
 [D2= Distance between the mental foramen to base of mandible]
 [D3= Distance between the mental foramen to alveolar crest]
 [D4= Distance between the mental foramen to symphysis menti]

5. Conclusion

Although a reliable and successful anesthesia in mandibular arch surgery is essential, it is more different to accomplish. The reason is that the position of anatomic structure such as the mandibular, mental and mandibular foramen varies. This study revealed the anatomical position of the mental foramen on the mandible. The variability of the position of the mental foramen should always be considered when diagnosing radiograph periapical areas and when undertaking periodontal or endodontic surgery in the area from the canine to the medial root of the first molar. This anthropometric study of mental foramen can help surgical procedure preventing injury to the related neurovascular structure.

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