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Original article:

Morphometric study of the position of mental foramen

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Abstract:

Introduction: The mandible is the largest , strongest and lowest bone of facial skeleton.The posterior and inferior borders of the ramus intersect to form the angle of the mandible.Mental foramen lies between the two premolars, it transmit mental nerves and vessels.

AIM:To study the angle of mandible for sex determination and position of the mental foramen in 100 dry human mandibles 55 males and45 females .

Materials and Methods :Measurement taken with thread and scale.Angle noted with help of protracter. A.position of mental foramen is noted: 1. Between1st & 2nd premolar.2. Below the apex of 2nd premolar.3. Between 2nd premolar & 1st molar .4. Below the apex of 1st molar.B. A.position of mental foramen in relation to superior and inferior border of mandible.

Result: The most common position of Mental foramen was situated between 1st and 2nd premolars, in 64% of mandibles. In children[14%] the mental foramen was seen towards the lower border of mandible ,In adult [66%] it was seen in the mid of shaft and in elders [20%]towards the superior border of mandible. There is a significant variation of the position of mental foramen seen with age.

Conclusion:There is a significant variation of the position of mental foramen seen with age, which is useful in forensic study.The knowledge about variability in position of mental foramen is important during surgical procedure and to achieve complete effect of anaesthesia after mental nerve block.

Keywords: Dry mandible, mental foramen, syphilis menti.

Introduction:

The mandible is the largest , strongest bone in the face. It has a horizontally curved body that is convex forwards with two broad rami, which ascend from the posterior end of the body. The rami bears the coronoid and condyloid processes. The mandible is considered suitable for study as it is the most durable bone of the facial skeleton and retains its shape better than other bones,Susan Standring Gray's 2016 (1). The posterior and inferior borders of the ramus intersect to form the angle of the mandible. The anterior border is sharp and continuous with the oblique line on the body of the mandible, to which buccinator is attached.The superior border is notched to form the mandibular notch. The majority of fractures of the mandible run posteriorly and inferiorly from the alveolar bone to the angle. The presence of a third molar tooth produces a line of weakness, and a fracture line will pass through its socket.

Mental foramen :

It lies halfway between the upper and lower borders of the body, in line with the interval between the two premolars, its position varies with age. The mental foramen is located on the anterolateral aspect of the body of mandible, midway between the superior (alveolar) and inferior borders . It has been shown to be located

precisely at the same levels in most humans (13-15mm superior to inferior border of the mandible) . It transmit mental nerves and vessels. Mental nerve is a branch of inferior alveolar nerve which supplies sensation to lower lip and the labial mucosa and lower canines and premolars. The most useful injection for anaesthetising the mandibular teeth is the inferior alveolar nerve block. To anaesthetise the anterior teeth, including the premolars and canines, inferior alveolar nerve block can be given adjacent to the mental foramen, Keith Moore, TVN Prasad, Mark G Torchia 2013(2).So the study of position and morphological variation of mental foramen is very important because it will be helpful to localise the important neurovascular bundle passing through the mental foramen.

In this regard, the availability of dry human bones like mandibles may be of utmost importance in studying in developing population definite standards for estimation of gender . The purpose of the present study was to analyse the applicability of various position of the mental foramen .

Material and Methods:

In the present study, a total of 100 dry human mandibles of both sex male 55 and female 45 without any gross breakage were collected from department of anatomy, government Stanley medical college .and are subjected for morphometrical analysis and evaluated. All mandibles were serially numbered from 1 to 100. Measurements were taken with thread and scale .

The position of mental foramen noted and were performed bilaterally and recorded..

I.A.position of mental foramen was noted in the following positions:

a.. Between1st & 2nd premolar

b. Below the apex of 2nd premolar

c. Between 2nd premolar & 1st molar

d. Below the apex of 1st molar.

B. Position of mental foramen in relation to symphysis menti and posterior border of ramus of the mandible and lower border of body of mandible

Results:

In the present study, a total of 100 dry human mandibles of both sexs and without any gross breakage were collected and are subjected for morphometrical analysis and evaluation. All mandibles were serially numbered from 1 to 100. The results obtained were tabulated, analysed and classified accordingly.

Table 1:Percentage of occurrences of position of mental foramen

s.no	Position of mental foramen	Percentage of occurrence
a.	Between 1st & 2nd premolar	64%
b.	Below the apex of 2nd premolar	21%
c.	Between 2nd premolar & 1st molar	10%
d.	Below the apex of 1st molar	5%

Position of mental foramen in relation with lower teeth

Mental foramen was situated between 1st and 2nd premolars , in 64% of mandibles, below the apex of 2nd premolar tooth in 21% of mandibles , between 2nd premolar tooth and 1st molar in 10% of mandibles and below the 1st molar tooth in 5% of mandibles.

Table 2 :Comparison of Percentage of occurrence of position of mental foramen with other studies

LOCATION OF MENTAL FORAMEN	AUTHORS	PERCENTAGE OF MOST COMMON LOCATION OF MENTAL FORAMEN
Below the apex of 2nd premolar	Singh & Srivastav et al(2010)(5)	68.8%
Between 1st & 2nd premolar	Lumnije Kqiku et al (2010)(4)	37.75%
Below the apex of 2nd premolar	Sumita gupta & Jagdhish s. soni (2012)(8)	75.8%
Between 1st & 2nd premolar	Rahul Rai , Shailaza Shrestha, Sudha Jha(2014)(3)	72.5%
Between 1st & 2nd premolar	Present study	64%

Table:3 Comparison of the result of para meters with other studies.

s.no	Mean distance from	Apinhasmit et al(2006)(6)	Prabodha et al(2006)(7)	Sumitha guptha and Jagadish s. soni (2012)(8)	Present study
1.	Symphysis menti	28.83mm	26.52mm	29.12mm	27.5mm
2.	Posterior border of ramus of mandible	68.88mm	65.38mm	74.16mm	66.2mm
3.	Lower border of ramus of mandible	14.88mm	12.25mm	14.45mm	14.3mm

Mean distance of Mental foramen from symphysis pubis in 27.5mm,, Mean distance of Mental foramen from posterior border of ramus of mandible is 66.2mm, Mean distance of Mental foramen from posterior border of ramus of mandible is 14.3mm.

In children the mental foramen was seen towards the lower border of mandible. In adult mental foramen was seen in the mid of shaft.In an adult with the advancement of age mental foramen is moved towards the superior border of mandible. This is mainly because of the loss of teeth and alveolar bone resorption. There is a significant variation of the position of mental foramen seen with age.

Discussion

In the present study,found that most common position of Mental foramen was situated between 1st and 2nd premolars as shown in table 1, in 64% of mandibles.It is greater than lumnije kqiku et al,(37.75%)(4) whereas its greater in Rahul Rai , Shailaza Shrestha,Sudha Jha (3)in their study mental foramen is situated between 1st and 2nd premolars (72.5%) of mandible. In author Singh & Srivastav et al (5)and Sumita gupta & Jagdhish s. soni (8) in their study (68.8%) and (75.8%) of mental foramen is situated below the apex of 2nd premolar tooth in of mandibles in Indian population. This is mainly due to loss of teeth and alveolar bone resorption. There is a significant variation of the position of mental foramen seen with age. Author sumitha gupta and jagdish s.soni (8)in their study found that with advancement of age mental foramen is moved towards the superior border of mandible.

In present study Mean distance of Mental foramen from symphysis pubis is 27.5mm, which is greater than Apinhasmit W et al(6) and Sumita gupta & Jagdhish s. soni (8)and lesser than Prabodha LBL, Nanayakkara BG(7). In this study Mean distance of Mental foramen from posterior border of ramus of mandible is 66.2mm, which is lesser than Apinhasmit W et al(6) ,Sumita gupta & Jagdhish s. soni (8)and Prabodha LBL, Nanayakkara BG(7). Mean distance of Mental foramen from posterior border of ramus of mandible is 14.3mm,which is greater than Prabodha LBL, Nanayakkara BG(7)and equivalent to Apinhasmit W et al(6) ,Sumita gupta & Jagdhish s. soni(8).

Conclusion

The anatomical variation in the position of the mental foramen should always be considered while performing periodontal or endodontic surgery in the area from canine to root of first molar tooth. The knowledge about variability in position of mental foramen is important in order to avoid nerve damage during surgical procedure and to achieve anaesthesia effect after mental nerve block.

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