

Position, Direction And Size Of The Mental Foramina Of The Mandibles Of Adult Male Southern Nigerians.

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Abstract

The purpose of this study was to determine the most common position, direction and size of the mental foramen in southern Nigeria population. Fifty nine (59) dry male mandibles were examined with the 1st and 2nd premolars and the first molar as reference points. A digital vernier caliper was used to measure the vertical and horizontal diameters of the foramina. The position, direction and size of the mental foramina of the left parts of the mandibles were compared with the same features of the right sides of the bones. The Z-test was used to analyze data obtained for statistical significance.

Results showed that the most common position of the mental foramen was in line with the long axis of the second premolar 54.24%, followed by the position between the 1st and 2nd premolars (25.42%). The most common course seen was posterior-superior 88.14% and posteriol 11.86%. The mean horizontal diameter of the left and right sides of the mandible were ($4.25 \pm 0.006\text{mm}$) and ($3.97 \pm 0.06\text{mm}$) respectively.

In conclusion, the most common position, direction and size of the mental foramen in adult male southern Nigerians is in line with the long axis of the second premolar tooth, the most common course is posterior-superior, respectively. The mental foramen of the left side of the mandible is slightly larger than the right side in Southern Nigeria.

INTRODUCTION

The mental foramen is an opening that lays half way between the upper and lower borders of the body of the mandible at both sides. It lies within the intervals between the two premolars (Chummy, 2006). It is a funnel-like opening in the lateral surface of the mandible at the terminus of the mental canal (Cheong et al, 2003).

Common variations are seen with respect to the anatomical position and location of the mental foramen. Example is a double mental foramen (Shaza et al, 2009). The position, orientation and size of the mental foramen have been studied by different individuals by means of direct measurements on dry mandibles or by using radiographs of dry mandibles or patients. It has also been analyzed by means of visual inspection in relations to first and second premolar teeth.

Fabian (2002) studied the position, shape and direction of opening of mental foramen in Tanzanian adult black males. 100 mandibles were used. In 45%, the mental foramen (MF) was located below the apex of the 2nd premolar, 35% between the 2nd premolar and first molar, 12% between the 1st and 2nd premolars and 8% below the 1st molar. The MF was asymmetrically located between the right and left sides

in 78% of the mandibles, the shape was oval in 54% and round in 46%. The direction of the opening was superiorly in 44%, posterior superiorly in 40%, labial in 10%, mesially in 3% and posterior in 3%. Unilateral double mental foramen was observed in 3% of the mandibles. Haghani et al (2009) worked on the radiographic evaluation of the mental foramen in a selected/remaining population. They evaluated 409 panoramic radiographs of patients. The MF was located between the first and second premolars in 47.2% of patients and in line with the second premolar in 46%. In 49.2% of males, the MF was in line with the second premolar. In 50.9% of females, it was between the first and second premolars. It was symmetrical in 85.7%. The position and dimension of the mental foramen in adult Malawian Mandibles was studied by Igbigbi et al, (2005). 70 adult indigenous Malawian mandibles of both sexes were used. In majority of cases, the MF was oval in shape, oriented postero-superiorly and bilaterally symmetrical. The mandibular tooth was inferior to the 2nd premolar tooth.

Mbajorgu et al, (1998) worked on the position, shape, and sizes of the mental foramen in black Zimbabweans. 32 mandibles were used. The shape of the MF was round in 14 out of 32 mandibles (43.8%) and was oval in the remaining

18 (53.3%). The percentage of occurrence of the MF was highest below the lower 2nd premolar tooth on the right side and posterior to it on the left side. Olasoji et al, (2004), studied the radiography and anatomy of the location of the mental foramen in northern Nigerian adults. 32 unsexed mandibles of bones in the Department Of Human Anatomy were also used. The most common location observed was the interdental space between the first and second mandible premolars (Radiography-34% and dry mandibles 32.8%). The second most common was the position apical to the second premolars (radiography 25.5%) and (dry mandibles 35.5%).

The aim of this study is to evaluate the position, dimension and course of the mental foramina of adult male mandibles of Southern Nigeria and to observe any variations in these characteristics.

MATERIALS AND METHOD

A total number of fifty nine (59) dry adult male mandibles. These mandibles were gotten from cadavers in the laboratories of the Department Of Anatomy, Abia State University, Department of Anatomy, University of Benin, Department of Human Anatomy, University of Calabar, Department Of Human Anatomy, Delta State University, Department Of Human Anatomy, Imo State University, and the Department of Anatomy, University of Port Harcourt.

The position of the mental foramen was measured using the vernier caliper with reference to the 1st and 2nd premolar teeth and first molar. The different positions arrived at were classified as follows;

The direction of the mental foramen was measured by drawing a measured box around the foramen. The measured box was further divided into four smaller equal boxes by a vertical and horizontal line drawn inside it. The vertical and horizontal line drawn inside it represents the superior and inferior directions and anterior and posterior directions respectively.

A long thin broom stick was inserted into the foramen from the lateral part of the mandible. The direction to which the broomstick pointed was visually inspected in the measured box.

The results of the different directions or courses of the foramina were then grouped into 8 as follows:

The size of each foramen was measured using a digital vernier caliper with an accuracy of 0.01mm to carefully span

across the length and width of the right and left foramina.

These measurements (size, direction and position of the foramina) were carried out on both sides of the mandibles, left and right sides of each foramen. Data collected from these measurements were analyzed using the Z-test.

Figure 1

Figure showing double mental foramen. (Adopted from Shaza 2009).



Figure 2

Figure showing the mental foramen.



RESULTS

The result of this study is as presented in the tables below:

Table1: Shows Percentage (%) frequency distribution of the position of the mental foramen. Table2: Percentage frequency distribution of the direction of the mental foramen. Table 3: Comparison of the mean, standard error and the standard deviation of right and left horizontal and vertical lengths of the mental foramen.

Figure 3

Table 1. Percentage (%) Frequency Distribution Of The Position Of The Mental Foramen

POSITION (x)	Frequency (f)	F(x)	Percentage (%)
P1	0.00	0.00	0.00
P2	0.00	0.00	0.00
P3	15	45	25.42
P4	32.00	128.00	54.24
P5	9.00	45.00	15.25
P6	3.00	18.00	5.09
	n=59	236	100.0

Figure 4

Table 2. Percentage(%) frequency distribution of the direction of the mental foramen

Direction(x)	Frequency(f)	F(x)	Percentage(%)
D1	0.00	0.00	0.00
D2	0.00	0.00	0.00
D3	0.00	0.00	0.00
D4	0.00	0.00	0.00
D5	7.00	35.00	11.86
D6	52.00	312.00	88.14
D7	0.00	0.00	0.00
D8	0.00	0.00	0.00
TOTAL	59.00	347.00	100.00

Figure 5

Table 3: showing the Mean± S.E, and the standard deviation (SD) of the right and left horizontal and vertical lengths of the mental foramen (mf).

PARAMETER	MEAN±SE (mm)	S.D
RIGHT HORIZONTAL	3.97±0.06	0.53
LEFTHORIZONTAL	4.25±0.06	0.52
RIGHT VERTICAL	2.98±0.06	0.47
LEFT VERTICAL	3.08±0.06	0.49

S.E = Standard error of the mean

DISCUSSION AND CONCLUSION

The present study has revealed that the most common position in relation to the mandibular teeth was P4 (in line with the long axis of the second premolar) with a percentage 54.24%. The second most common position was P3 (between the first and the second premolar) with a percentage of 25.42%. The third most common position was P5 (between the second premolar and the first molar) with a percentage of 15.25%. The fourth most common position was P6 (the mesial half of the first molar) with a percentage of 5.08%. There was no case noted in position 1 and 2. There was no case of differences in position of the foramen with respect to the sides (left or right). The findings we have made agree with observations of some researchers that the position, caliber and course of the mental foramen may vary. However, we have observed some differences in the pattern and relative distribution of the extent of these variations. The reasons for these anatomical variations of the mental foramen in this population may be as a result of heredity, method of evaluation of the mandibles, development of dentition and or preservation/ preparation of specimen.

Our findings correspond with the study carried out by Fabian (2002). He revealed that 45% out of 100 mandibles of Tanzanians examined, had their mental foramen located in line with long axis of the second premolar. It also corresponds with the work done by Haghanifer et al, (2009) on a selected Iranian Population. Out of 178 radiographs examined, 49.2% were in line with the long axis of the second premolar. This also corresponded with works done

by Mendonca et al, (2008) on Brazilian mandibles and Igbigbi et al, (2005) on adult Malawian mandibles. The analysis done on the direction or orientation of the mental foramen revealed the most common direction as D6 (Posterosuperiorly) the second most common direction as D5 (posterior). Our finding also corresponds with the work done by Philips et al, (1990) who, out of 75 adult mandibles examined, it's most usual direction of exit was in a posterosuperior direction.

From the analysis of the dimensions of the foramen, the left mental foramen was seen to be larger than right foramen. This is statistically significant ($P < 0.05$) This is consistent with the work done by Philips et al, (1990) who concluded in his findings that the mental foramen was larger on the left side of the mandible. An accessory mental foramen was observed in one of the mandibles on the left side. The accessory mental foramen was positioned superiorly to the regular mental foramen. The two foramina, both the accessory and the regular were of a very small diameter. The accessory mental foramen (vertical and horizontal diameters) was 1.4mm and 1.75 mm respectively.

CONCLUSION

Variations were observed in anatomical location, size and course of the mental foramen in southern Nigerian adult males mandibles as observed elsewhere. The foramina coursed postero-superiorly in majority of specimens studied. The calibers of the left mental foramina were seen larger than the right. The knowledge of the anatomy of the mental foramen is important clinically in administration of local anaesthetics, avoiding injuries to neurovascular bundles it

transmits in carrying out intra-oral or cutaneous perimandibular incisions.

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