Original Article

A Radiographic Study of Mental Foramen

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ABSTRACT

Background: The radiographic position of mental foramen is important to avoid the complications during the surgical procedures. The purpose of this study is to determine the most common location and appearance of mental foramen in general population of Ghaziabad district; Western Uttar Pradesh. **Aim:** To determine the most common location of mental foramen in the general population of Ghaziabad at different age groups and also to assess the appearance of mental foramen within the individuals in Panoramic radiograph taken among the general population of Ghaziabad. **Materials and Methods:** A total of100 Panoramic radiographs were evaluated with regard to the position and appearance of the mental foramen among the general population of Ghaziabad at the various age group i.e.20 – 29,30 – 39,40 -49 and 50 – 59 Years. **Results and Observations:** In the present study of 100 patients, it was observed that the most common position of mental foramen is located in line with the second premolar (position4) and the appearances separated type was reported equally in both males and female.

Key-Words: Mental Foramen, Panoramic, Appearance, Position

INTRODUCTION

Anatomically, the mental foramen is the opening of the short mental canal, a branch of the mandibular canal. Mental foramen is frequently described as situated in the region of t second premolar in the fully developed mandible.[1] Although on most panoramic radiographs, the radiographic landmarks of the mental foramen can be observed, the appearance of these landmarks varies without any change of radiographic conditions.[2] The location of mental foramen varies among the different anatomic investigations performed. According to Tebo (1950) & Mastuda (1927) the mental foramen can be found in various locations ranging from the roots of the first premolar to the roots of the first molar. The location of the mental foramen differs not only in the mesio distal plane but also the inferio-superior plane and in its relation to the apices of the adjacent premolar teeth.[3] The determination of the location of mental foramen is of importance for differential diagnosis of the periapical Radiolucencies in the premolar area and for instance in the administration of local anesthesia for surgical, operative or diagnostic purpose and in endodontic treatment.[4,5] According to **Yosue and Brooks (1989)** the radiographic appearance of mental foramen is of 4 types: 1- Continuous :-Mental foramen is in continuity with the mandibular foramen, 2- separated type : foramen is distinctly separated from the mandibular foramen, 3- Diffuse with distinct border of the foramen while the fourth group is unidentified type.[2] Hence, the need was felt to study the location of mental foramen through the panoramic radiography.

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AIMS AND OBJECTIVES

- To Determine the most common location of mental foramen in in panoramic radiograph among the general population of Ghaziabad at different age groups.
- To Assess the appearance of mental foramen within the individuals in panoramic radiograph among the general population of Ghaziabad.

Inclusion Criteria

Patients who reported to Department of Oral medicine and Radiology, Ghaziabad of age group between 20 years to 60 years of age were included in the study and was free of any pathology or deformities.

Exclusion Criteria

- Presence of radiolucent pathological lesions in the lower jaw anywhere in the area extending from the right first molar to the left first molar and No visualization of the mental foramen bilaterally
- Incomplete eruption of permanent tooth.
- Patient below 19 years of age were excluded.

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- Presence of periodontal lesions.
- Patients with a history of orthodontic treatment.
- Presence of crowding and spacing in the lower arch.

METHODOLOGY

A total of 100 subjects who were willing to participate after taking informed consentwere considered for the study. The present study is IRB Approved and the relevant data was entered in the tabular form. The selected subjects were further categorized as male and females (Table - 1). The panoramic radiographs were taken byCS 8000C with high quality with respect to angulation and contrast.

According to **Yosue and Brooks (1989)[2],** the Radiographic Appearance of mental foramen can be classified into four types (FIG 1).

- **A Continuous type** which shows continuity with the mandibular canal through the mental canal.
- **A Separated type** in which the foramen is distinctly separated from the mandibular canal.
- **A Diffuse type** in which the foramen has an indistinct border.
- **Unidentified type** in which the mental foramen cannot be identified on the panoramic radiographs under ordinary exposure and viewing conditions.

According to **HAGHANIFAR AND ROKOUEI (2009)**[5], the Position of the mental foramen was recorded as follows: (Fig 2):

- **Position 1:** Situated anterior to the first premolar
- **Position 2:** In line with the first premolar
- **Position 3:** Between the first and second premolar.
- **Position 4:** In line with second premolar
- **Position 5:** Between second premolar and first molar.
- **Position 6:** In line with first molar.

RESULTS AND OBSERVATIONS

Table 1: Distribution of Males and Females

Age Groups	Male	Females
20-29	19	24
30-39	10	9
40- 49	9	10
50- 59	9	10
Total	47	53

Table 2: Position of mental foramen Age-wise

Age group Yrs	M/F	Position 1	Position 2		Position 3		Position 4	Position 5	
			L	R	L	R		L	R
20-29	M(N=19)	NIL		NIL	5	0	12	1	
	F(N=24)	NIL	NIL		3	7	13	1	NIL
30-39	M(N=10)	NIL	NIL	NIL	3	3	4	NIL	NIL
	F(N=19)	NIL	NIL		3	4	2	NIL	NIL
40-49	M(N=9)	NIL	NIL	NIL	1	3	4		NIL
	F(N=10)	NIL	NIL	NIL	4	2	3		NIL
50-59	M(N=9)	NIL	1	NIL	2	3	3	NIL	1
	F(N=10)	NIL	1	NIL	4	3	2	NIL	NIL
Total		0%	3%		49%		43%		

Table 3: Appearance of mental foramen Age wise

Age Group (Yrs)	Separated	Continuous	Diffuse	Unidentified
20-29 M(n=19)	14	05	02	01
F(n= 24)	14	05	02	Nil
30-39 M(n=10)	05	02	04	Nil
F (n = 9)	05	01	03	Nil
40-49 M(n = 9)	06	01	03	Nil
F(n=10)	06	Nil	03	Nil
50-60 M(n=9)	05	Nil	03	Nil
F(n=10)	05	Nil	03	Nil
Total (%)	60	13	26	01

DISCUSSION

Anatomically the mental foramen is the opening of short mental canal; a branch of mandibular canal. Although on most panoramic radiographs; the radiographic landmarks of mental foramina can be observed; the appearance and position of these radiographs varies without any change of radiographic condition.[1,2] In the present study, a series of 100 panoramic radiographs were taken and noted that the location of mental foramen varied widely; 49% of cases of mental foramen was located between the 1st and 2nd premolars and 46% was in line with the 2nd premolars. Thus, these two positions accounted for 89% of the cases. It was noted that within the age group 0f 20 -29 years;

Fig 1A: Appearance of mental foramen (continuous)

Fig 1B: Appearance of mental foramen (separated)

Fig 1C: Appearance of mental foramen (diffuse)

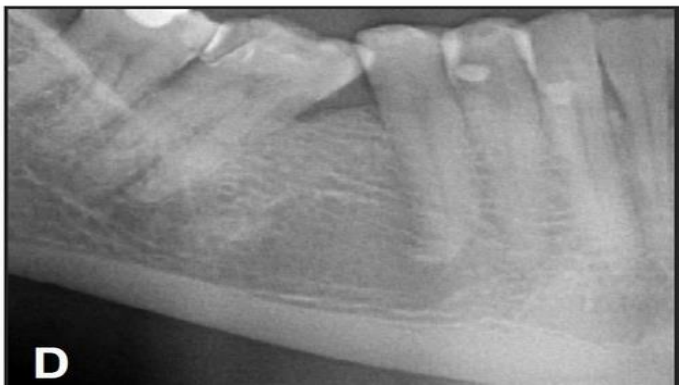

Fig 1D: Appearance of mental foramen (unidentified type)

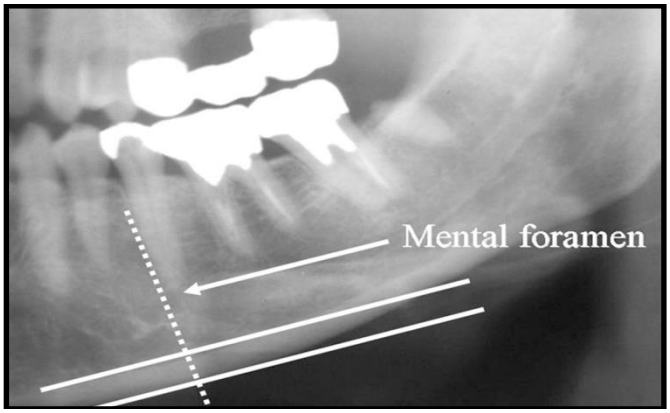

Fig 2: Method used to determine the position of mental foramen

among males and females that there was no case found in position 1(anterior to 1st premolar); position 2 was 5.2% in males group and 0% in female group; followed by the position 3 on left side is 26.4% of male group as compared to 12.5% of the same side among the females; the most common position is position 4 which is 63.15% among males compared to 54% in females.(Table 1) There was equal distribution of foramina on the left side and right side (5.2%) of position 5 among males and 4% of female group on left side.(Table 2). With in the age group of 30–39 years; there were no cases found with respect to position 1 and position 2 in both genders. The most common position is position 3 were males (60%) and females (77.8%) with more on the right side (44.4%) than left side. With in the age group of 40 – 49 years; there were no cases found with respect to position 1 and position 2 in both genders. The most common position is position 3 (60%) on the left side (40%) in females and in males it is 33% more on the right side. The more cases of location of mental foramina under position 4(44%) and 5 (22%) were more in males as compared to females–22% and 0% respectively. With in the age group of 50–59 years; there was one case reported each in respect to position 2 in both the sexes, the commonest position being the position 3(70%) on left side (40%) in females and whereas, in males (33%) on right side. A was done by Moiseiwtsch et al in 1998 stated that the most common location of mental foramen was between the two premolars.[4] These findings are consistent with the study results. A similar study was done by Haghanifar and Rokouei et al in 2009 stated that the 47.2% of the cases of mental foramen was located between the first and second premolar and in 46% was in line with the second premolar; thus, these two-position accounted for 93.2% of the cases.[5] In case of appearance of mental foramen; the most common one being the separated type cases reported equally in both males

(73%) and females (58%) between the age group of 20 – 29 years; The continuous, diffuse and un identifiedtypes are26.3% ,10.5%and 5.2% among males and 20%, 8.3% and 0% among the females of 20–29 years age group respectively. Thus, the un identified type was found more in males as compared to females. The separated type cases reported equally in both males (50%) and females (55%), continuous, diffuse and un identified types are 10% ,40%and 0% among males and 11%, 50% and 0% among the females of 30–39 yrs. grouprespectively. (Table 3) A similar study was done by Yosue et al in 1989 reported the most frequent appearance was separated type (43%) followed by diffuse (24%), continuous (21%) and un identifiedtype (12%) which was confluent with present study.[3] The separated type reported equally in both males (66%) and females (60%)., Continuous, diffuse and un identified types are 11% ,33% and 0% among males and 0%, 30% and 0% among the females of 40–49 yrs age group respectively. The separated type in both males (55%) and females (50%), continuous, diffuse and unidentified types are 0%, 33%and 0% among males and 0%, 30% and 0% among the females of 50–59 yrs age group respectively.

CONCLUSION

The most common position of mental foramen is between the two premolars (position 3) of left side among females and in line with the second premolar (position 4) among males. The mental foramina are usually symmetrically located on both sides. The appearance of mental foramen on panoramic radiographs can be divided into four types: Continuous, separated, diffuse and unidentified. The most frequent appearance of the mental foramen is the separated type. It is strongly suspected that sometimes the radiographic landmark of what is described as mental foramen is actually a section of the mental canal.

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